FACTORS ASSOCIATED WITH CERTAIN ABILITIES POSSESSED AND JOBS TAUGHT IN SELECTED LIVESTOCK ENTERPRISES BY TEACHERS OF VOCATIONAL AGRICULTURE IN MICHIGAN

Thesis for the Degree of Ed. D.

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Conrad Paul White

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This is to certify that the

thesis entitled

FACTORS ASSOCIATED WITH CERTAIN ABILITIES POSSESSED AND JOBS TAUGHT IN SELECTED LIVESTOCK ENTERPRISES BY TEACHERS OF VOCATIONAL AGRICULTURE IN MICHIGAN

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by

Conrad Paul White

A THESIS

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

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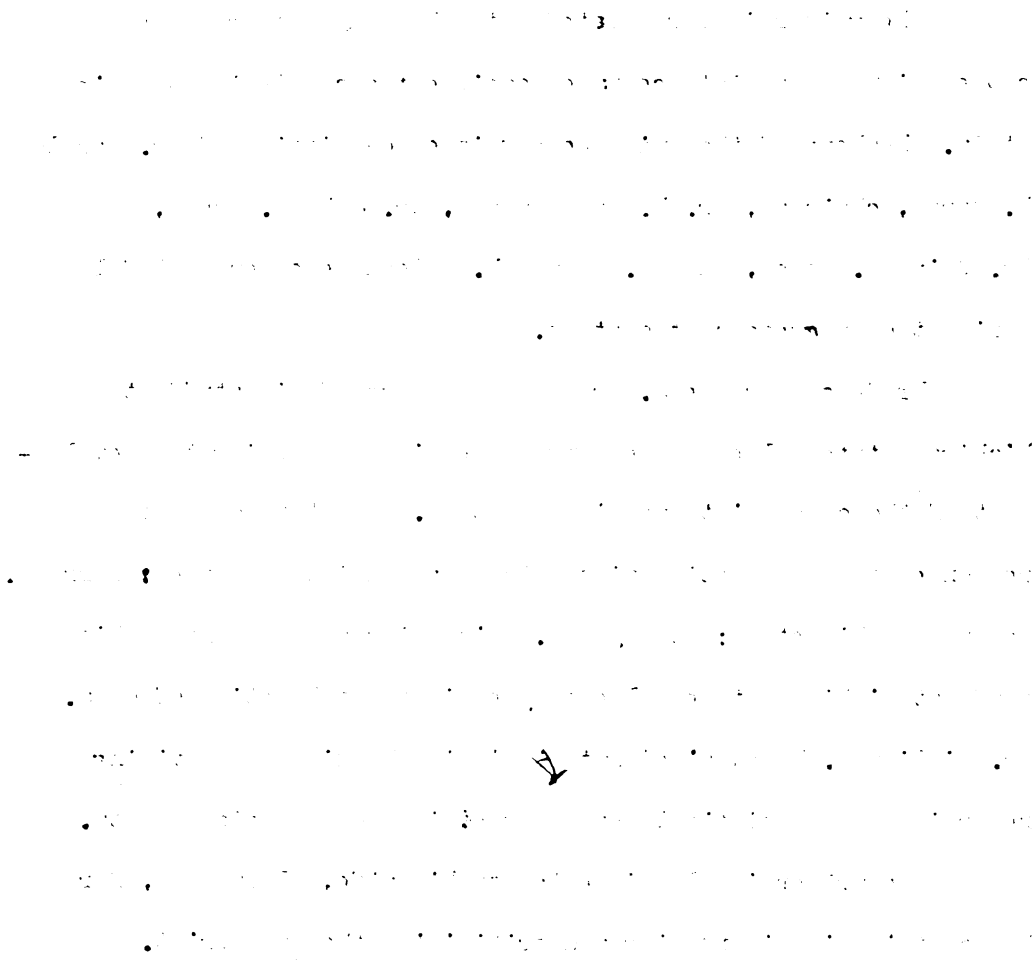

TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION	1
	Background for the study	1
	The problem	21
	Basic assumptions	23
	Scope of the study	26
	Limitations of the study	28
	Definitions of terms used	29
II.	REVIEW OF RELATED STUDIES	33
	Studies of technical knowledge in agriculture possessed by teachers	33
	Studies of abilities in agriculture possessed by teachers	36
	Studies of agriculture in the preparatory curriculum for prospective teachers	45
	Studies of knowledge of subject matter possessed by teachers of other subjects	55
	Summary	58
III.	METHODS OF INVESTIGATION	62
	Selection of the area to be studied	62
	Determination of abilities and jobs to be included	63
	Construction of the check-list	64

CHAPTER

IV. MAT

MA

Co

Co

Co

Sum

V. MANAG

MANA

Com

Com
ar

Comp
ar
11

Summ

CHAPTER PAGE

Try-out of the check-list 65

Administration of the check-list 66

Summarization of data 67

Analysis of data 74

IV. MANIPULATIVE ABILITIES POSSESSED BY TEACHERS AND MANIPULATIVE JOBS TAUGHT 76

Comparisons between "majors" and "non-majors" . . . 77

Comparisons between "more-experienced" teachers and "less-experienced" teachers 82

Comparisons between teachers in "more-important" areas and teachers in "less-important" areas of livestock production 86

Summary 89

V. MANAGERIAL ABILITIES POSSESSED BY TEACHERS AND MANAGERIAL JOBS TAUGHT 91

Comparisons between "majors" and "non-majors" . . . 92

Comparisons between "more-experienced" teachers and "less-experienced teachers 96

Comparisons between teachers in "more-important" areas and teachers in "less-important" areas of livestock production 99

Summary 103

TABLE

VI. CO

VII. CO

VIII. SU

CHAPTER PAGE

VI. COMPARISONS OF TYPES OF ABILITIES POSSESSED BY TEACHERS, COMPARISONS OF TYPES OF JOBS TAUGHT, AND CORRELATIONS BETWEEN ABILITIES AND JOBS TAUGHT IN EACH ENTERPRISE 104

Comparisons between manipulative abilities and managerial abilities 105

Comparisons between manipulative jobs and managerial jobs taught 106

Correlations between abilities possessed by teachers and jobs taught 108

Summary 120

VII. COMPARISONS BETWEEN ABILITIES IN DIFFERENT ENTERPRISES POSSESSED BY TEACHERS AND COMPARISONS BETWEEN JOBS TAUGHT IN DIFFERENT ENTERPRISES TO ALL-DAY CLASSES 123

Comparisons between abilities of teachers in the different enterprises 124

Comparisons between jobs taught in the different enterprises to all-day classes 129

Summary 133

VIII. SUMMARY, CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FURTHER STUDY 134

Summary 135

Conclusions 139

Implications 144

CHAPTER PAGE

Suggestions for further study 147

BIBLIOGRAPHY 151

APPENDIX 155

CHAPTER PAGE

Suggestions for further study 147

BIBLIOGRAPHY 151

APPENDIX 155

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II. Yea

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VII. Num
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VIII. Num
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IX. Num
A
J
d

X. Num
A

XI. Num
M
to

LIST OF TABLES

TABLE		PAGE
I.	Credits in Animal Husbandry Possessed by Teachers Included in the Study	69
II.	Years of Experience of Teachers Included in the Study .	70
III.	Per Cent of Total Farm Income from Livestock Enterprises in Counties Where Teachers Included in the Study were located	71
IV.	Number of Majors and Non-majors by Per Cent of Manipulative Abilities Possessed in the Livestock Enterprises	78
V.	Number of Majors and Non-majors by Per Cent of Manipulative Jobs Taught in the Livestock Enterprises to All-day Classes	81
VI.	Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Manipulative Abilities Possessed in the Livestock Enterprises . . .	83
VII.	Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Manipulative Jobs in the Livestock Enterprises Taught to All-day Classes	84
VIII.	Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Manipulative Abilities Possessed in the Livestock Enterprises . . .	87
IX.	Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Manipulative Jobs Taught in the Livestock Enterprises to All-day Classes	88
X.	Number of Majors and Non-majors by Per Cent of Managerial Abilities Possessed in the Livestock Enterprises . . .	93
XI.	Number of Majors and Non-majors by Per Cent of Managerial Jobs Taught in the Livestock Enterprises to All-day Classes	95

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IIII. Number
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TABLE PAGE

XII. Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Managerial Abilities Possessed in the Livestock Enterprises 97

XIII. Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Managerial Jobs in the Livestock Enterprises Taught to All-day Classes . . 98

XIV. Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Managerial Abilities Possessed in the Livestock Enterprises . . 100

XV. Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Managerial Jobs Taught in the Livestock Enterprises to All-day Classes 102

XVI. Number of Teachers by Per Cent of Manipulative Abilities and Managerial Abilities Possessed in Each Livestock Enterprise 105

XVII. Number of Teachers by Per Cent of Manipulative Jobs and Managerial Jobs Taught in Each Livestock Enterprise to All-day Classes 107

XVIII. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Beef-cattle Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 109

XIX. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Sheep Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 111

XX. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Swine Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 113

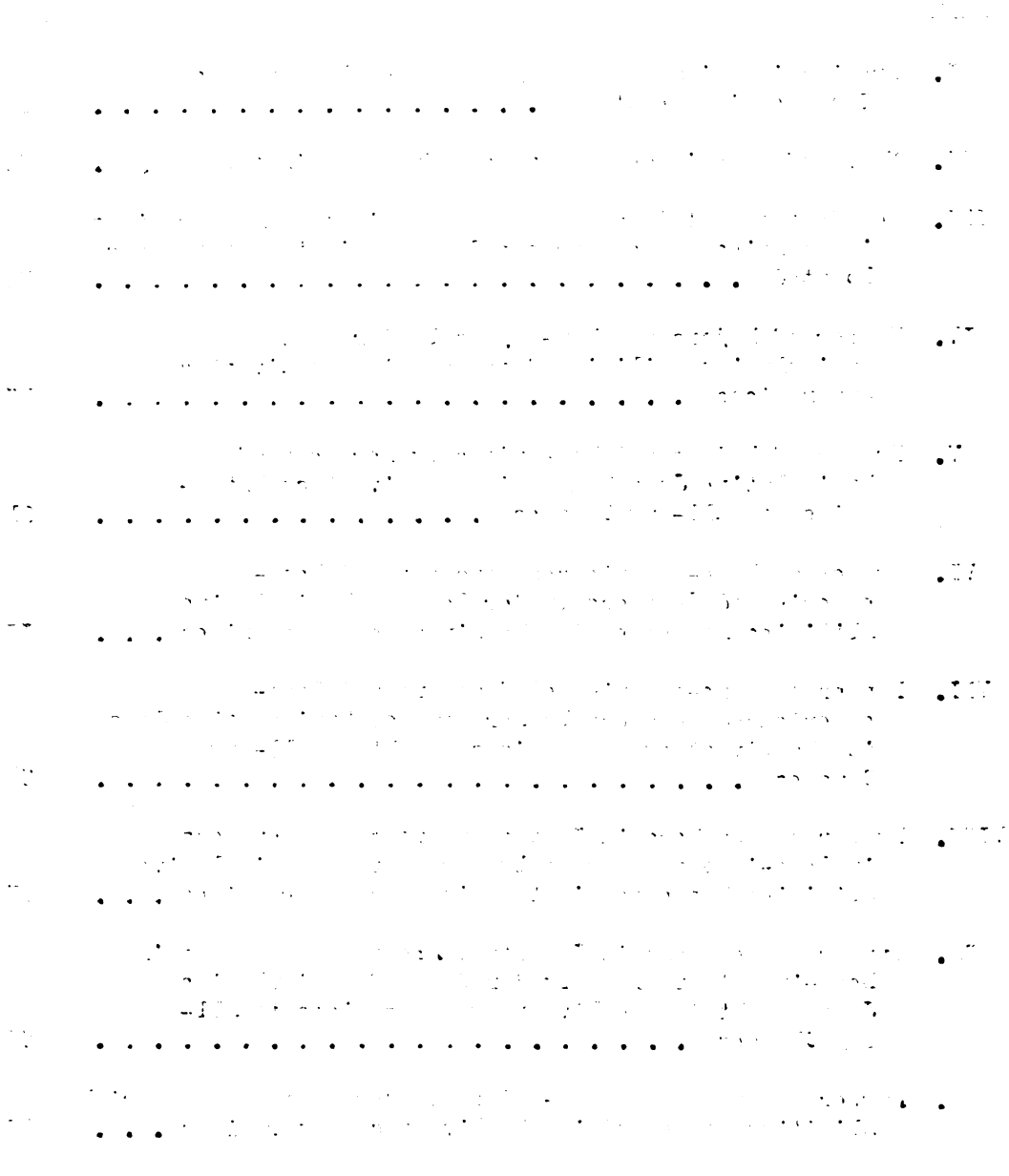

TABLE PAGE

XII. Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Managerial Abilities Possessed in the Livestock Enterprises 97

XIII. Number of More-experienced Teachers and Less-experienced Teachers by Per Cent of Managerial Jobs in the Livestock Enterprises Taught to All-day Classes . . 98

XIV. Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Managerial Abilities Possessed in the Livestock Enterprises . . 100

XV. Number of Teachers in Important Areas and Teachers in Less-important Areas by Per Cent of Managerial Jobs Taught in the Livestock Enterprises to All-day Classes 102

XVI. Number of Teachers by Per Cent of Manipulative Abilities and Managerial Abilities Possessed in Each Livestock Enterprise 105

XVII. Number of Teachers by Per Cent of Manipulative Jobs and Managerial Jobs Taught in Each Livestock Enterprise to All-day Classes 107

XVIII. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Beef-cattle Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 109

XIX. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Sheep Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 111

XX. Number of Teachers Who Could Do Each of the Manipulative Jobs in the Swine Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 113

XII. N

XIII. N

XIII. Nu

XIV. Co

XV. Nu

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XVII. Nu

XVIII. Nu

TABLE PAGE

XXI. Number of Teachers Who Could Do Each of the Managerial Jobs in the Beef-cattle Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-school Classes 115

XXII. Number of Teachers Who Could Do Each of the Managerial Jobs in the Sheep Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-School Classes 117

XXIII. Number of Teachers Who Could Do Each of the Managerial Jobs in the Swine Enterprise, Number Who Taught Each of These Jobs to All-day Classes, and Number Who Taught Each of These Jobs to Out-of-school Classes 118

XXIV. Correlations between Abilities Possessed and Jobs Taught 121

XXV. Number of Teachers by Per Cent of Manipulative Abilities Possessed in Each Livestock Enterprise 124

XXVI. Number of Teachers by Per Cent of Managerial Abilities Possessed in Each Livestock Enterprise . . 128

XXVII. Number of Teachers by Per Cent of Manipulative Jobs Taught in Each Livestock Enterprise to All-day Classes 130

XXVIII. Number of Teachers by Per Cent of Managerial Jobs Taught in Each Livestock Enterprise to All-day Classes 132

LIST OF FIGURES

FIGURE		PAGE
1	Location, by Counties, of the 45 Teachers Included in the Study	73

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CHAPTER I

INTRODUCTION

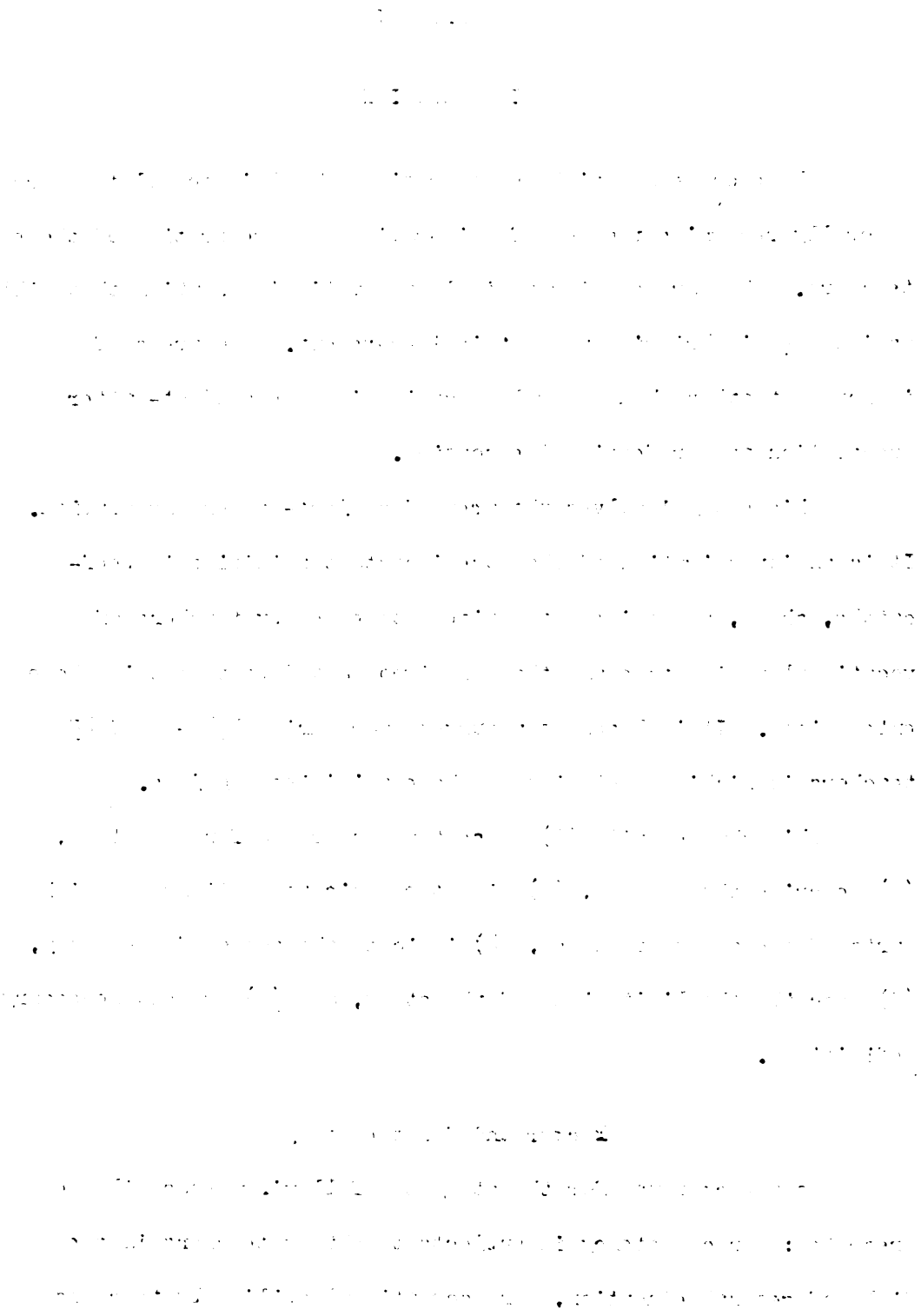
Those concerned with the education of public school teachers generally recognize the need for improving the preparation of these teachers. They are seeking reliable and valid information that will assist them in bringing about this improvement. The areas of improvement other than general education include subject-matter preparation and professional education.

This study involves the area of subject-matter preparation. It is an investigation of the more important abilities in beef-cattle, sheep, and swine enterprises possessed by teachers of vocational agriculture and the more important jobs taught in these enterprises. It is based on a survey made during 1949-50 of 45 teachers in Michigan relative to these abilities and jobs.

This chapter will (1) present a background for the study, (2) describe the problem, (3) list the basic assumptions on which parts of the study are based, (4) indicate the scope of the study, (5) describe the limitations of the study, and (6) present necessary definitions.

Background for the Study

As a background for the study the following needs will be presented: for competency in subjects taught by teachers in the field of general education, for occupational ability by teachers



of any subjects taught in vocational education, for competency in technical agriculture by teachers of vocational agriculture, for occupational ability by teachers of vocational agriculture, and for teachers of vocational agriculture to possess abilities and teach jobs in livestock enterprises. Brief consideration will be given to: selection of students for prospective teachers; pre-service education; in-service education; and selection and placement of teachers of vocational agriculture as they relate to these needs.

How important is competency in subjects taught for any teacher? In answer to this question, some opinions of educators and some results of their studies will be presented. Most of these educators agree that teachers should be competent in subjects taught if they are to be successful in the teaching profession.

Barr[1] studied the characteristic differences between good and poor teachers of social studies. In ranking 23 of the most frequent practices of good teachers, he found that showing a superior knowledge of subject matter ranked seventh in the group of practices. Being in the upper third of the characteristics ranked, would indicate that a superior knowledge of subject matter was important

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[1]A. S. Barr, "Teaching Competencies," Encyclopedia of Educational Research, Revised edition, 1950, p. 1449.

for a person who desired to become a good teacher.

Several investigators have sought to determine why teachers fail. On the basis of the results of these investigations, Barr[2] developed a list of causes of failures among teachers. Of the 17 causes of failures in the list, the lack of mastery of subject matter taught ranked third in frequency. This rank indicates that a lack of competency in the subject taught is closely associated with a person being a failure as a teacher.

Additional evidence on the importance of competency in subject taught for a teacher to be successful is indicated by Barr's statement, "Other studies reveal similar general pictures of the good teacher."[3]

The four most frequent causes of teacher failure as reported by Madsen[4] ranked as follows: poor knowledge of subject matter, lack of instructional skill, inability to systematize work, and poor discipline.

Shannon[5] also believes that a knowledge of subject matter

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[2] Ibid., p. 1445.

[3] Ibid., p. 1449.

[4] I. N. Madsen, "The Prediction of Teaching Success," Educational Administration and Supervision, Vol. 13, Jan. 1927, pp. 30-47.

[5] J. R. Shannon, "Competencies Aimed at in the Education of Teachers at Indiana State Teachers College," Teachers College Record, Vol. 8, July 1942, pp. 125-26.

is important because he lists this factor as one that contributes most to teaching success.

The performance of 47 good teachers and 47 poor teachers was analyzed in another study by Barr.[6] There were 15 qualities that could be considered as contributing to good teaching but not critical. A knowledge of subject matter was one of three qualities possessed by all good teachers and by none of the poor teachers.

Subjective pupil ratings were used by Hart[7] to determine why teachers were or were not liked. The pupil ratings indicated that the best-liked teacher was more exacting in standards of work, better at explaining lessons, and knew subject matter.

Other educators disagree with those just quoted as to the importance of competency in subjects taught for teachers of any subjects. Bittler[8] found that a lack of preparation and lack of instructional skill were given as the reasons for the failure of only 29 of 680 teachers who had failed.

The importance of subject matter is de-emphasized by

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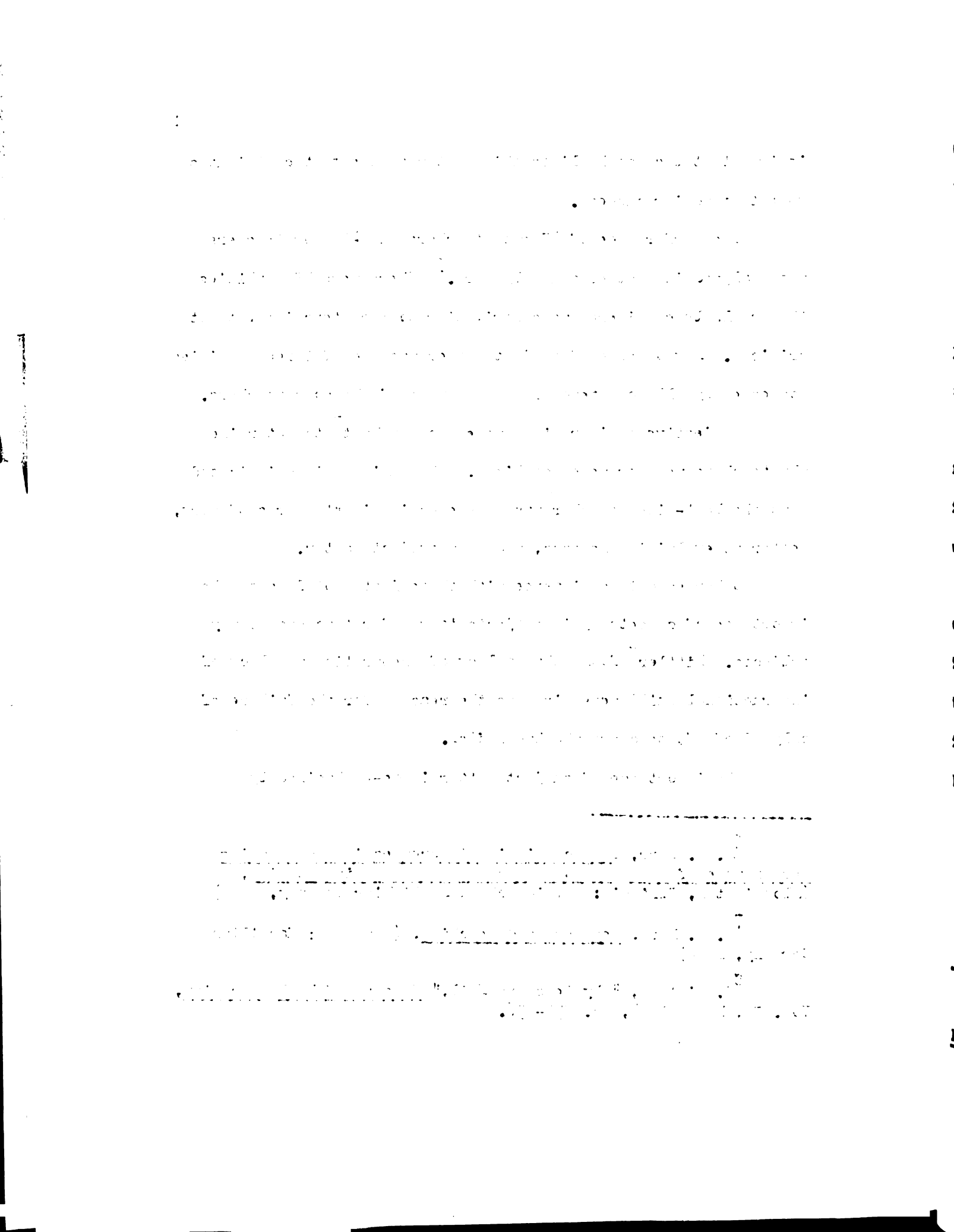
[6] A. S. Barr, Characteristic Differences in the Teaching Performance of Good and Poor Teachers of the Social Studies, (Bloomington, Illinois: Public School Publishing Company, 1929)

[7] F. W. Hart, Teachers and Teaching, (New York: Macmillan Company, 1934)

[8] S. Bittler, "Why Teachers Fail," Home and School Education, Vol. 33, March 1914, pp. 255-256.



Cox[9] in this statement: "Teachers should receive a general education because subject matter is not the teachers' chief need."

The writer did not find any studies dealing with importance of competency in subject taught for teachers in which the opinions of local school administrators were included. Such studies might present a truer picture as to the causes of teacher failure or success.

Even though most of the educators quoted believe that this factor is important for the success of teachers, no evidence was found that indicated the possession of competency in subjects taught would assure success in teaching.

Occupational ability for teachers of any subject in vocational education is important. Such teachers must have had experience in doing important jobs in their occupation if they are to be able to teach these jobs. That occupational competence is very important for the success of any instructor in vocational education is the belief of Prosser and Quigley who express it in this manner:

> As a working principle which has found wide acceptance in State and National legislation regulating vocational schools we have the seventh theory that vocational education will be effective in proportion as the instructor has had successful experience in the application of skills and

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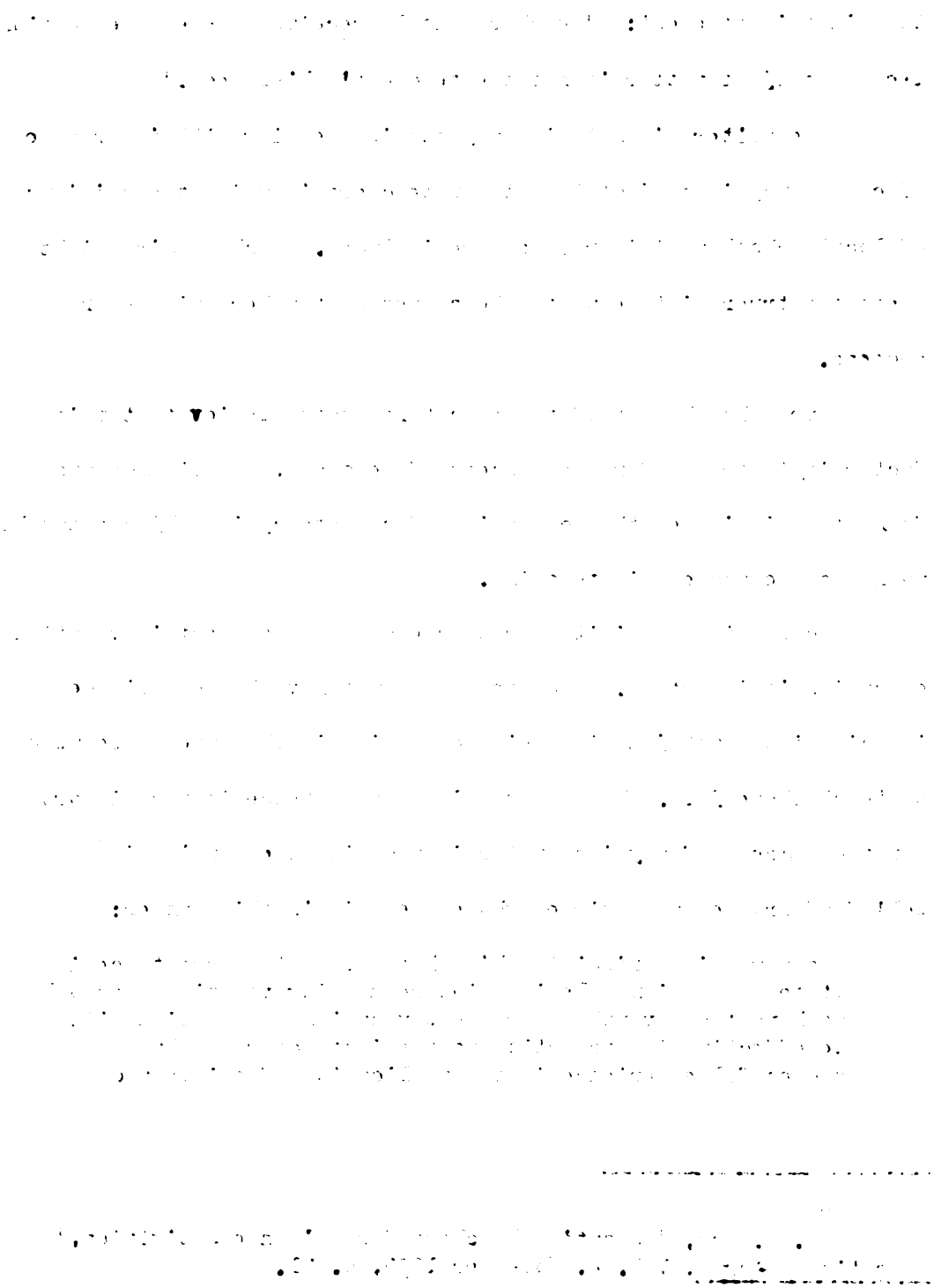
[9] P. W. Cox, "Educating Teachers for Guidance Activities," Educational Forum, Vol. 4, November 1939, p. 51.



knowledge to the operations and processes he undertakes to teach.[10]

These two authorities also emphasize the importance of occupational training for instructors by listing it as one of 20 special efficiency factors in vocational education. They say that:

> Other things being equal, that scheme will be more efficient which employs an occupationally trained instructor to give real experience on real jobs in a real occupational environment.[11]

The importance of this factor in the selection of prospective teachers is stressed by Benjamin B. Mallary of the University of California in discussing vocational teacher training:

> . . . Real occupational experience under employment conditions is increasingly stressed as a qualification of teachers in all vocational fields.
> 2. There is a slight trend in the direction of insisting that the occupational background of the prospective vocational teacher possess quality and breadth rather than interpretation in terms of length of experience only. Occupational fitness is now viewed as a specific rather than a general ability.[12]

According to these statements by Mallary, it would be expected that a young man who was raised on the farm and had successful

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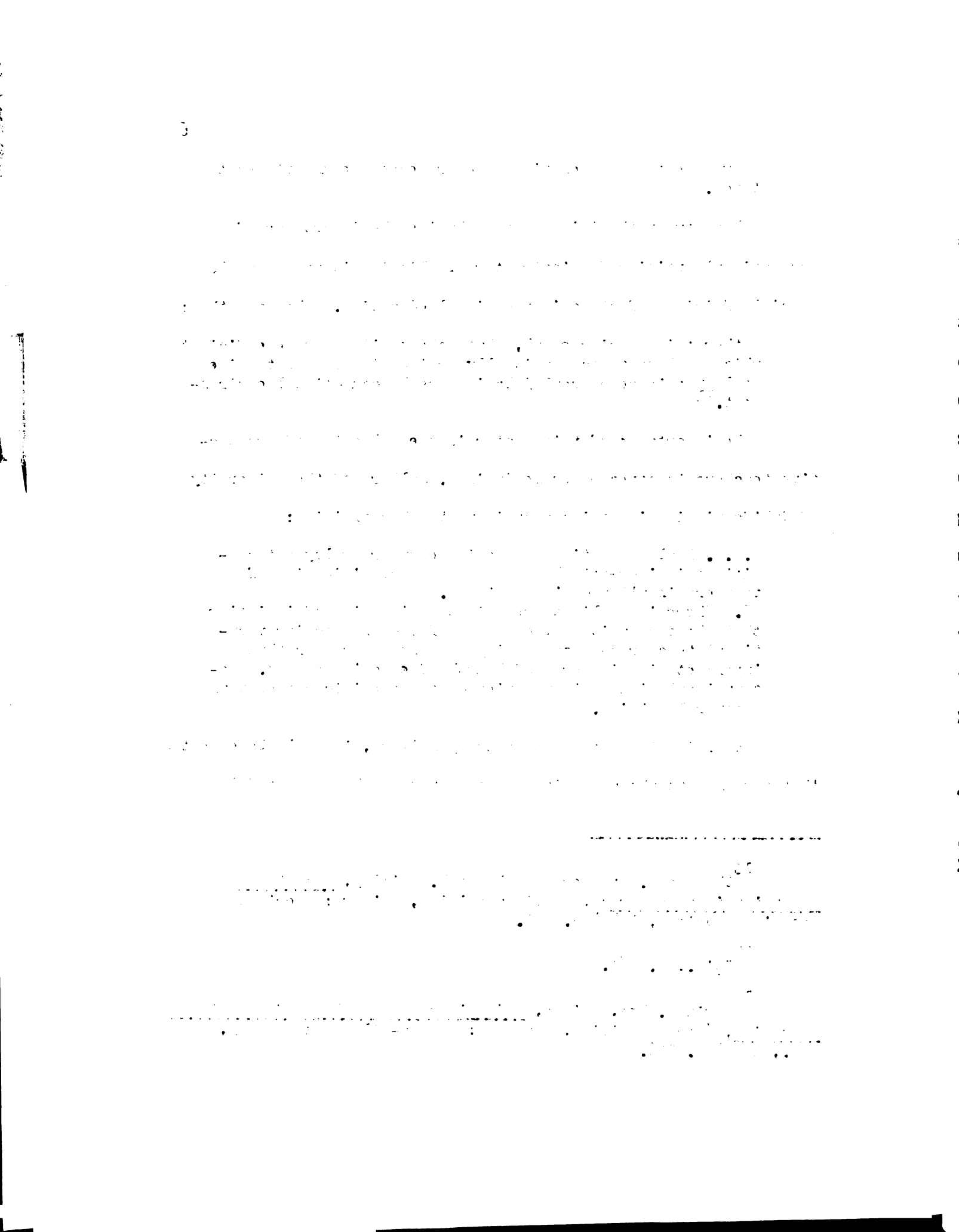
[10] Charles A. Prosser and Thomas H. Quigley, Vocational Education in a Democracy, (Revised edition, Chicago: American Technical Society, 1949) p. 223.

[11] Ibid., p. 361.

[12] Edwin A. Lee, Editor, Objectives and Problems of Vocational Education, (Second Edition, New York: McGraw-Hill Book Company, Inc., 1939) p. 226.



experience in the supervised farming program in vocational agriculture, would be a more likely prospect for a teacher of vocational agriculture than a young man with none of this experience.

Additional support of the importance of occupational ability for teachers in vocational education is indicated by the occupational experience requirement of these teachers in Michigan. A teacher of vocational agriculture is required to have two years of practical farm experience after becoming fifteen years of age.[13] A teacher of vocational homemaking must have at least three years of participation in homemaking activities.[14] Trade and industrial teachers are required to have from three to six years experience as a wage earner in the trade or industrial occupation taught.[15] For a teacher of business education, one to three years of business experience is required.[16] Similar requirements are included in plans for vocational education in other states.

Competency in agriculture is essential for the teacher so

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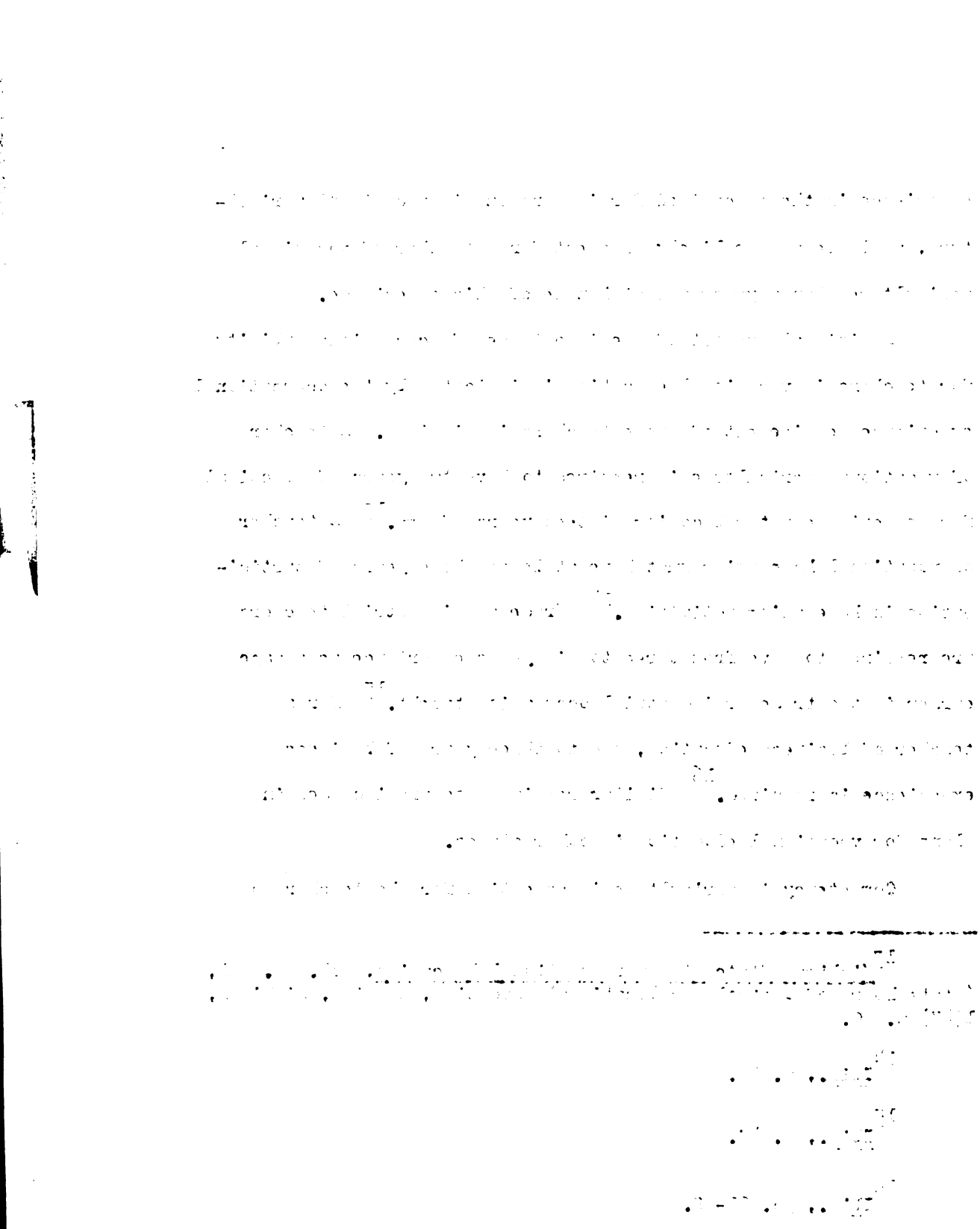
[13] Michigan State Plan for Vocational Education, Bul. No. 201, (State Board of Control for Vocational Education, Lansing, Michigan, 1947) p. 20.

[14] Ibid., p. 35.

[15] Ibid., p. 45.

[16] Ibid., pp. 27-28.



that he will be able to teach the managerial jobs in vocational agriculture. Opinions of some leaders in the field of agricultural education will be given regarding the need of competency in agriculture for teachers of this subject.

If competency of the teachers in agriculture is to be considered as similar to competency of the farmer in agriculture, then Hammonds answers the question of the need for this competency by stating:

> Agriculture has to do with farming. It is both an art and a science. As a science it has its organized body of knowledge of causes, effects, laws, and principles for guiding and directing the agricultural skills.
> To the extent that learned behavior is significant, teaching must be significant. If a man's learning makes him largely what he is, directing the learning process becomes exceedingly important. What one is taught matters a great deal.[17]

Cook believed that the teacher of vocational agriculture must be competent in the various areas of the subject taught. To possess this competency, the teacher must know how to apply the knowledge that he has gained from the technical courses he has taken in agriculture. His comments concerning this competency are as follows:

> A person must be trained to do the jobs he will have to do as a teacher of vocational agriculture. Hence, he must

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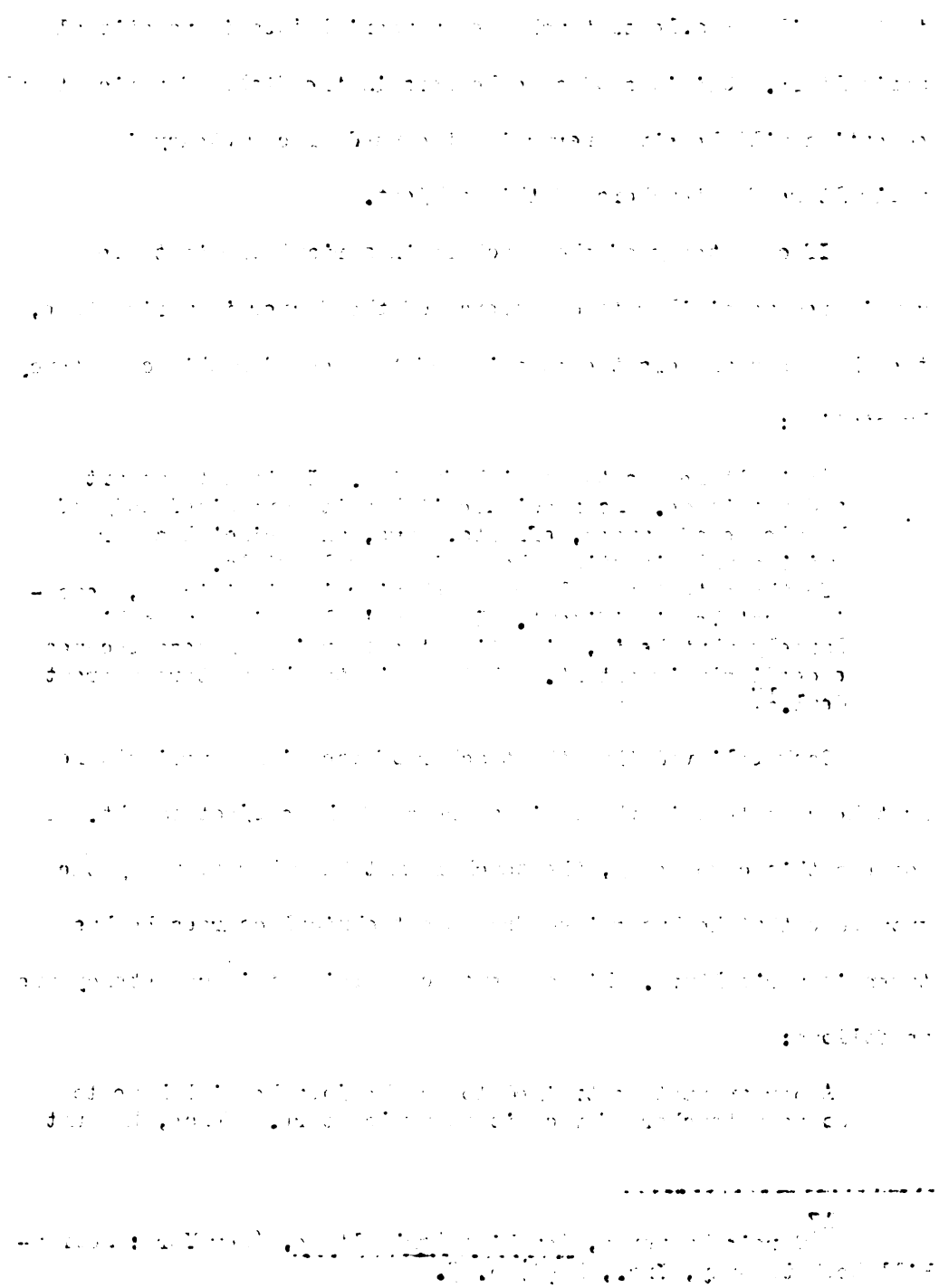
[17] Carsie Hammonds, Teaching Agriculture, (New York: McGraw-Hill Book Company, Inc., 1950) p. 3.



> take technical courses in such areas as: livestock, field crops, soils, farm management, horticulture, rural economics, and farm mechanics. He must be trained in scientific information and also have an opportunity to develop skills which he will need in providing instruction for present and prspective farmers. He must know how to apply the knowledge he has gained.[18]

Subject matter and methods of presentation are constantly changing. These changes are greater in some fields than in other fields. Subject matter and methods of presentation are continually changing in the field of agriculture. These changes require that educators know what courses are needed by teachers of vocational agriculture to meet their needs. Garris emphasizes the importance of meeting these changing needs by saying:

> All public school teachers have the dual responsibility of keeping up with changes in their technical field (or fields) and in the area of improving their methods of teaching. In certain subject matter fields the facts taught are constantly changing while in others they may remain rather static. The teacher of vocational agriculture is in a dynamic field. A survey should be made to determine what technical and professional courses would best suit the needs of employed agriculture teachers.[19]

As partial evidence of the importance of vocational agri-

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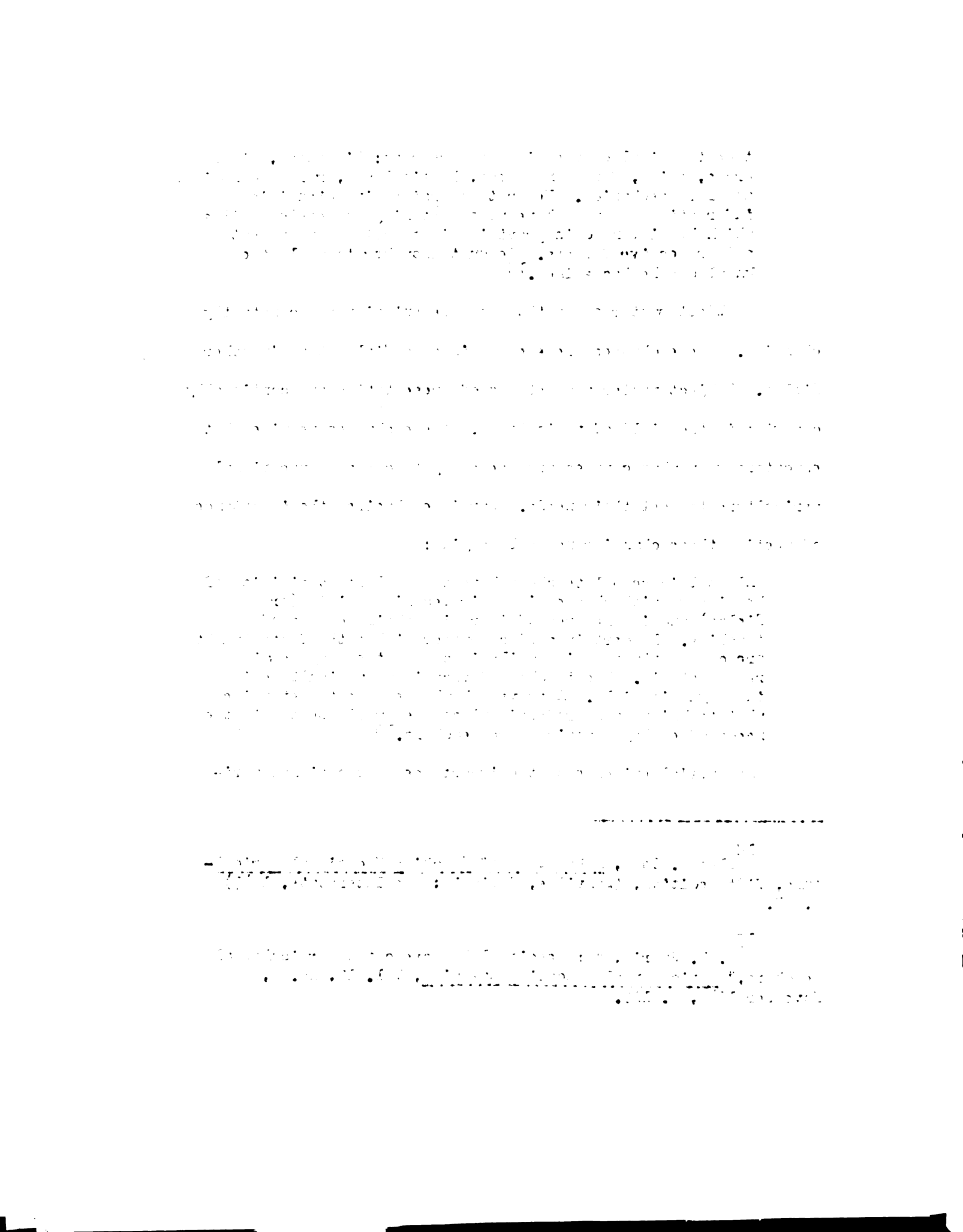
[18] Glen C. Cook, A Handbook of Teaching Vocational Agriculture, fifth edition, (Danville, Illinois: The Interstate, 1947) p. 27.

[19] H. W. Garris, "Professional Improvement of Agricultural Teachers," Agricultural Education Magazine, Vol. 12, No. 5, November 1948, p. 110.



culture in Michigan and the need for its teachers to be competent in agriculture, a brief presentation will be made of the increase in the number of departments and of the increase in enrollments in these departments since vocational agriculture was first taught in the state. Vocational agriculture was first taught in Michigan in 1917-18 after the passage of the Smith-Hughes Act in 1917. During that fiscal year 2,535 students were enrolled in all-day classes in 43 departments in the state.[20] During the fiscal year of 1949-50, a total of 10,482 all-day students were enrolled in 206 departments.[21] Also, 805 students were enrolled in 53 young-farmer classes, and 4,918 students were enrolled in 163 adult-farmer classes in Michigan.[22] The total enrollments in all classes make an average enrollment of about 80 students per department. If this large number of present and prospective farmers is to receive adequate instruction in the science of farming, it will be necessary

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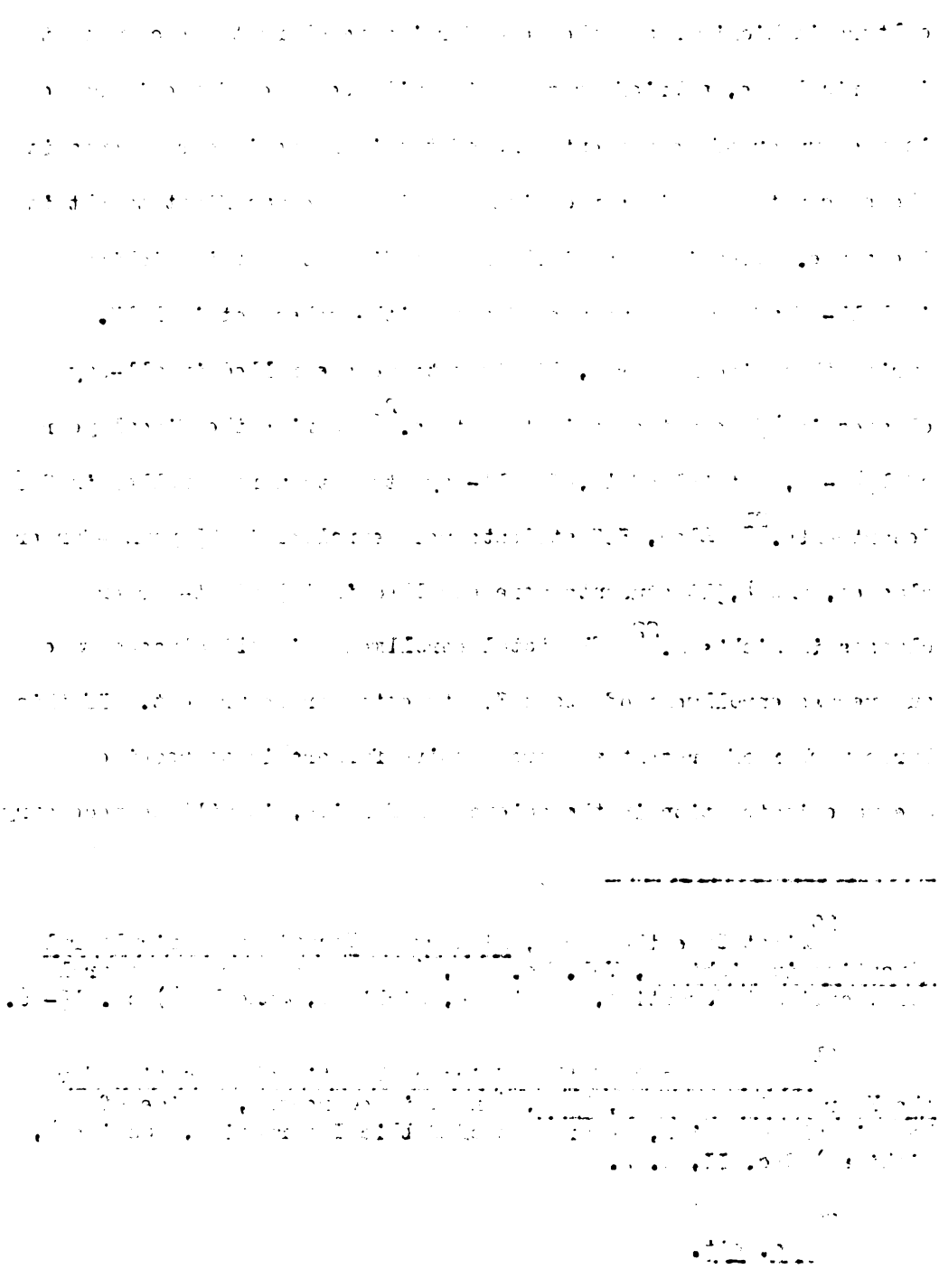
[20] First Came the Farms, History of Vocational Agricultural Education in Michigan, Vol. No. 259, (The State Board of Control for Vocational Education, Lansing 4, Michigan, June 1944) pp. 15-16.

[21] Annual Report of the Office of Vocational Education for the Year Ending June 30, 1950, (unpublished report, Office of Vocational Education, Department of Public Instruction, Lansing 4, Michigan) Sec. II, p. 2.

[22] Loc. cit.



that the teachers of vocational agriculture be competent in agriculture. Because of the constant changes occurring in the many areas of agriculture, it is very important that pre-service courses and in-service courses in agriculture be available to meet the needs of the teachers.

It is necessary for a person to have occupational ability in order that he may be able to teach manipulative jobs to present and prospective farmers. Manipulative abilities are necessary if farmers are to be successful in the production of products in the occupation of farming. Regarding these doing abilities of farmers, Hammonds expresses himself thusly:

> As an art, agriculture is a composite of manipulative skills in the control of plant and animal life in producing utilities for man. The art side of agriculture consists of the manipulative skills acquired by the farmer and may or may not represent "artistic" mastery. Agriculture is a so-called practical art; it aims at a utility. The art side is the doing side. The farmer must be able to do what is necessary in producing the utilities. The farmer must perform, or have performed, the labor of production and disposal of his products. This calls for qualifications of specific character including particular habits of overt activity and standards of achievement. These constitute the skills.[23]

If these manipulative abilities are necessary for farmers to operate their farms successfully, then teachers of vocational agriculture should have abilities in the occupation of farming.

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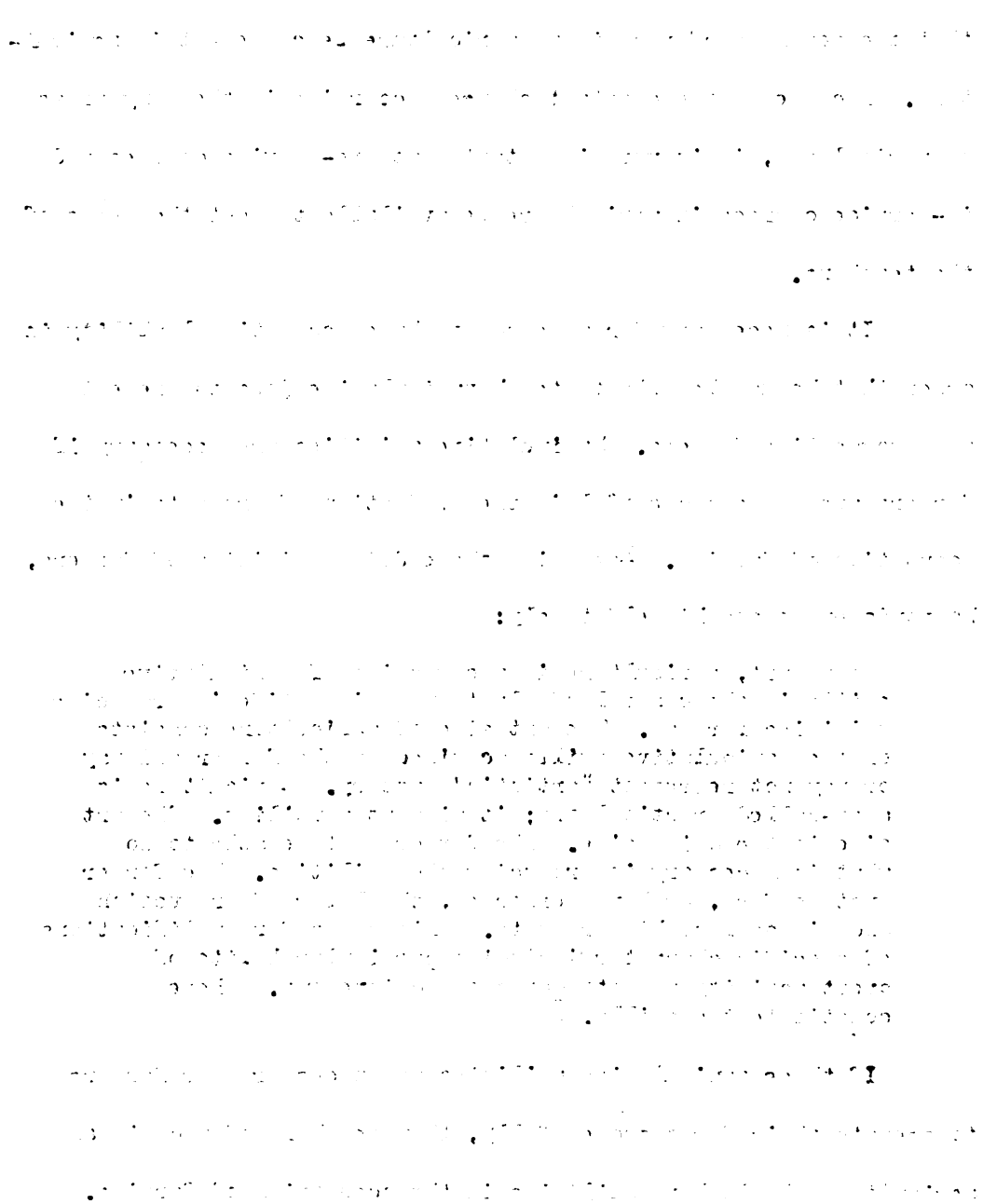
[23] Hammonds, op. cit., pp. 3-4.



This occupational ability is essential for teachers because their students are present and prospective farmers who need to acquire these abilities. Hammonds elaborates on this point as follows:

> Many of the abilities in farming are manipulative or manual in character. Manipulative abilities are important to success in farming, though it is easily possible to overestimate them as determinants of success in operating a farm. The agricultural teacher is concerned with developing manipulative abilities or skills in his students.[24]

Occupational ability of teachers of vocational agriculture is very closely related to their occupational background. Many abilities in agriculture that these teachers possess were acquired when the teachers were living on farms. The importance of this occupational ability is stressed by Cook:

> Every person that plans to teach vocational agriculture should have a background of farm experience . . . . Many of the abilities learned on the farm will be helpful in teaching vocational agriculture.[25]

Hammonds makes an excellent summary of the importance of occupational ability in agriculture in which the implication is for both the teacher and students:

> The aim of vocational agriculture is preparation for a vocation or occupation in agriculture. The aim of this education in agriculture under the Federal Acts is "to train present and prospective farmers for proficiency in

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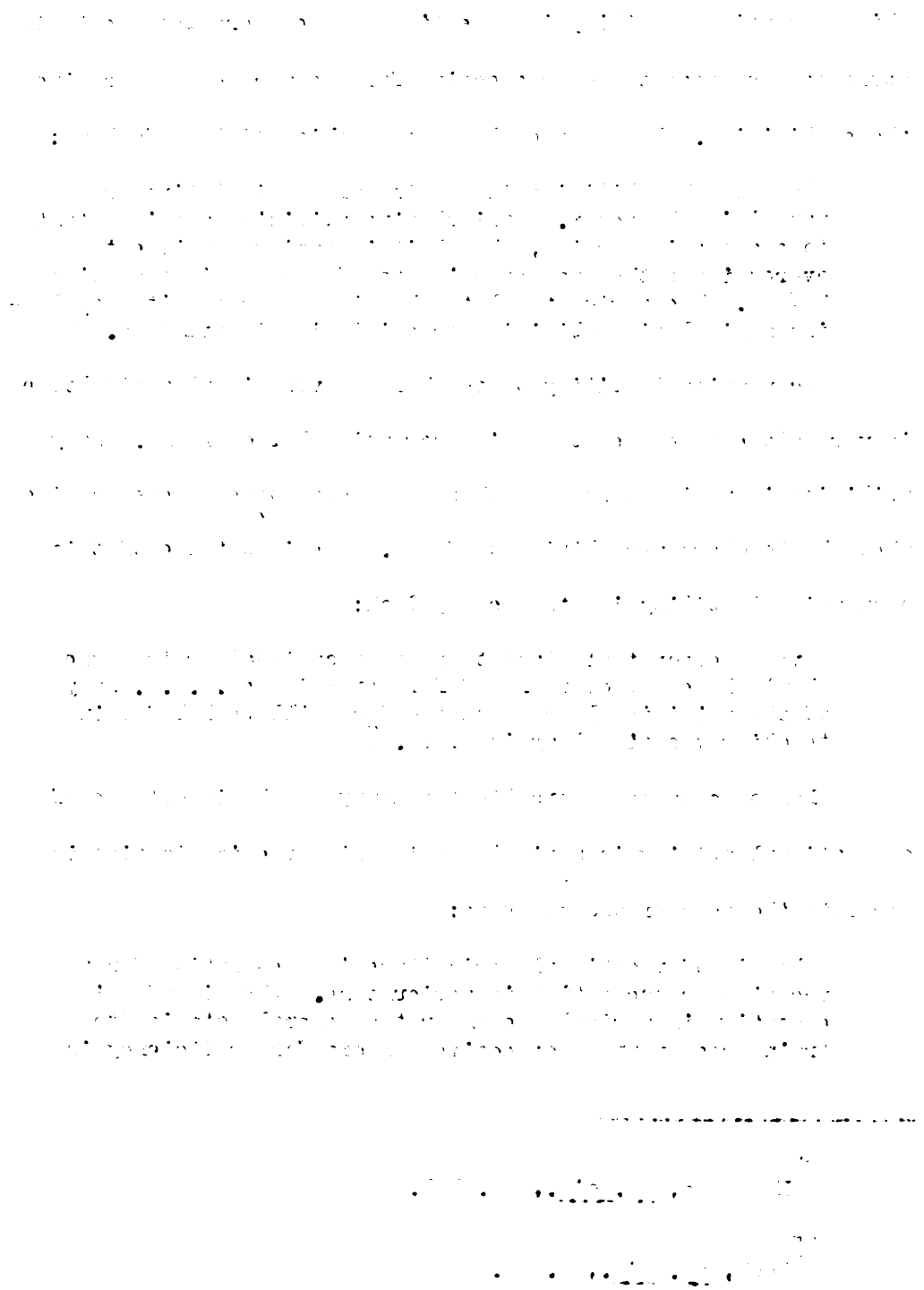
[24] Hammonds, op. cit., pp. 141.

[25] Cook, op. cit., p. 29.



> farming." Thus the aim is proficiency in a specific farming vocation, there is no doubt about it. The training is for people who are already farmers and for those who are to become farmers.[26]

The primary function of vocational education in agriculture is to develop abilities in thinking and doing of present and prospective farmers so that they will be more efficient in the occupation of farming. These abilities in thinking and doing must be developed under the instruction and supervision of a person who is competent in the occupation of agriculture. The only person who is qualified to give this instruction and supervision is one who has most of these abilities dealing with agriculture. He can do jobs and teach jobs that are essential in farming.

Some studies have been made regarding the needs for teaching various areas of subject matter in the field of agriculture. A citation will be made of one of these studies dealing with the needs for teaching some of the different phases of animal husbandry to students in vocational agriculture. Starrak made a study which indicates that some farmers in Iowa feel the need of instruction in livestock production in a program of agricultural education in high school. Of 243 successful farmers reporting, 94 per cent indicated the need for abilities to feed and manage livestock; 90.9

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[26] Hammonds, op. cit., p. 6.

per cent indicated the need for abilities to select and buy good livestock; and 85.8 per cent indicated the need for abilities to recognize and control common diseases of livestock.[27] Some of these abilities are included in the current study by the writer.

In determining the need for instruction in the beef-cattle, sheep, and swine enterprises by students in vocational agriculture, consideration will be given to the growth and extent of these enterprises in the supervised farming programs of these students. As the departments and enrollments in vocational agriculture in Michigan increased in numbers, the productive projects in the supervised farming programs of all-day students increased in scope.

Constituting part of the growth of the supervised farming programs was the growth of livestock projects in these programs. The first year that any of the teachers included in the present study taught vocational agriculture was 1937-38. Comparisons will be made of the extent of productive projects in beef-cattle, sheep, and swine enterprises between the fiscal years of 1937-38 and 1949-50.

During 1937-38 there were 4,816 completed productive projects in all enterprises represented in the supervised farming programs

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[27] James A. Starrak, "The Education of 'Dirt' Farmers," Agricultural Education Magazine, Vol. 18, No. 6, December 1945, pp. 114-115.

of all-day students in Michigan; of these projects 767 or 15.9 per cent were beef cattle, sheep, and swine.[28] During 1949-50 there were 10,931 completed productive projects of all-day students in Michigan; 2,374 of these projects, or 21.7 per cent were beef cattle, sheep, and swine.[29] The number of productive projects in these livestock enterprises increased about 6 per cent between 1937-38 and 1949-50.

The total net project income from all enterprises represented in the supervised farming programs of all-day students in Michigan for 1937-38 was $305,137.20; of this income, $46,909.07 was from beef-cattle, sheep, and swine enterprises.[30] The net project income from all enterprises represented in the supervised farming programs of all-day students in Michigan for 1949-50 was $1,829,807.15; of this income $255,516.74 was from beef-cattle, sheep, and swine enterprises.[31] Though the net project income from these livestock enterprises was approximately 14 per cent of the total project income

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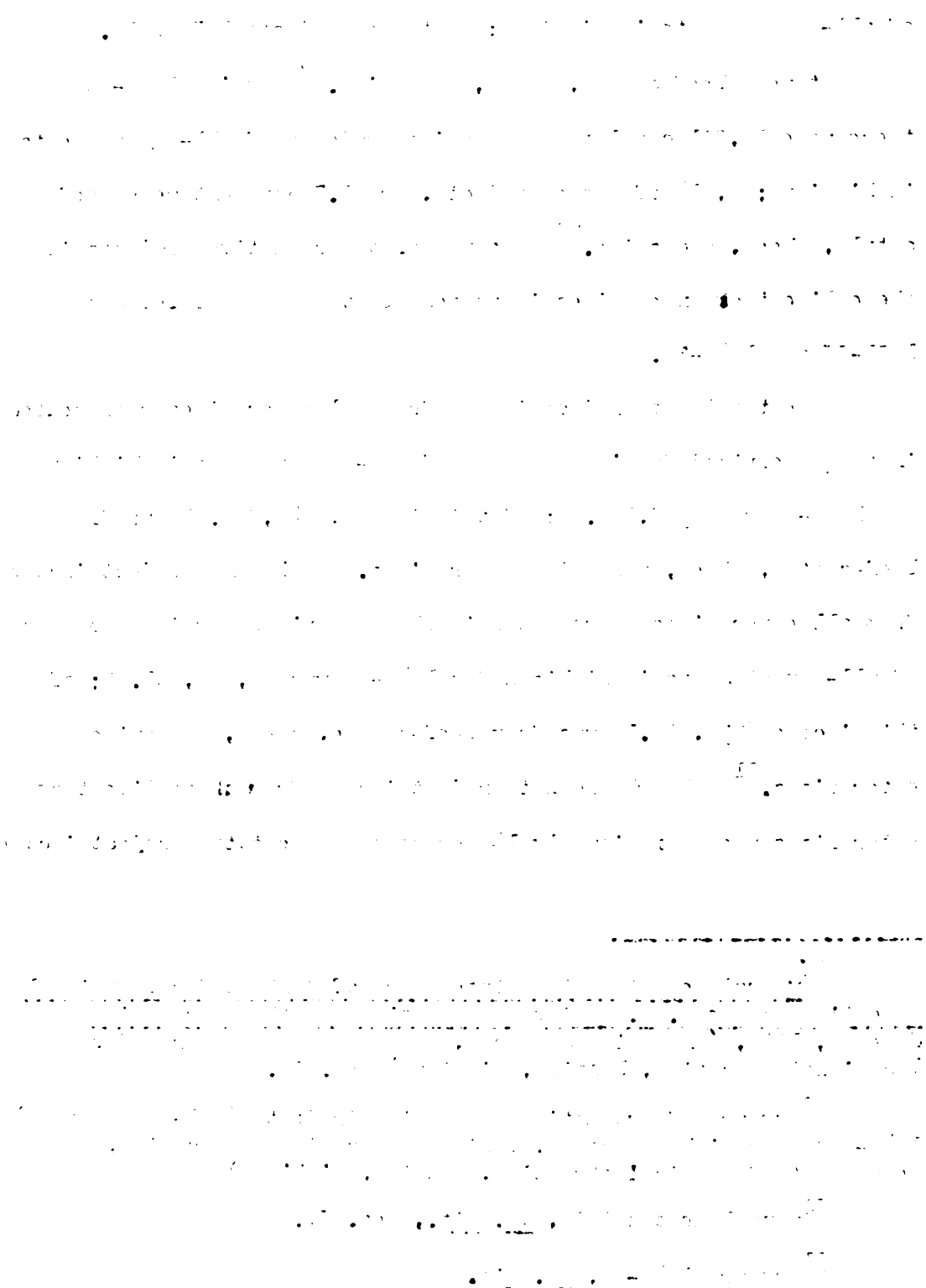
[28] Annual Report of the State Board of Control for Vocational Education to the U. S. Office of Education for the Year Ending June 30, 1938, (unpublished Report, State Board of Control for Vocational Education, Lansing, Michigan) Sec. IV.

[29] Summary of Productive Enterprise Projects (all-day classes) 1949-50" Unpublished Records, Office of Vocational Education, Department of Public Instruction, Lansing, Michigan)

[30] Annual Report 1938, Op. cit., Sec. IV.

[31] Summary 1949-50, Op. cit.



from all enterprises during each year, the total net project income from livestock enterprises in 1949-50 was approximately five-and-one-half times as large as it was in 1937-38. The difference in price levels is probably partially responsible for the big difference in the net project income for the two years.

The continued increase over the period of years in the scope and income of productive projects in beef-cattle, sheep, and swine enterprises indicates that these enterprises are very important in the program of vocational agriculture in Michigan.

The total farm income for Michigan for 1945, which was the last year for which information was available, was $366,287,712.00, of which $72,865,027.00, or 19.89 per cent was from beef cattle, sheep, and swine.[32] This income indicates that these livestock enterprises are important sources of farm income for the farmers of the state as well as for all-day students in vocational agriculture.

If students enrolled in agriculture are to receive adequate instruction in these three important livestock enterprises, it will be necessary that the teachers possess the essential abilities in these enterprises and that they teach the essential jobs in the enterprises.

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[32] United States Census of Agriculture for 1945 for Michigan, Vol. I, Part 6, Department of Commerce, (Washington, D. C.: 1946) p. 7.

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Are prospective teachers of vocational agriculture being selected who have enough abilities in animal husbandry so that, with the pre-service-education and in-service-education they will receive, they will be proficient in teaching in this area of agriculture?

A "farm experience inventory" is used at Michigan State College in ascertaining the farm experiences and some of the farm skills that prospective teachers of vocational agriculture possess. These inventories are completed by the prospective teachers of vocational agriculture toward the end of the sophomore year when they take their first course in education. On the check-list, the prospective teacher indicates his farm experience prior to high-school graduation, while attending college, and his full-time experience. Also, he indicates his experience in occupations closely related to agriculture.

The fundamental farm skills are grouped according to enterprises. In the beef-cattle enterprise are listed nine skills, in the dairy-cattle enterprise are 28 skills of which some apply to beef cattle, in the sheep enterprise are 26 skills, and in the swine enterprise are 19 skills. The prospective teacher indicates whether he has performed the job and if he feels qualified to perform the job at the present time.

A brief summary will be given of the farm skills in the livestock enterprises possessed by 50 graduates in agricultural

education at Michigan State College in 1949-50. Of these graduates, 74 per cent had done less than one half of the jobs in the beef-cattle enterprise, and 22 per cent of them had not done any of the jobs in this enterprise. They were less qualified in the sheep enterprise as 86 per cent of the graduates had done less than one half of the jobs in this enterprise, and 48 per cent had not done any of the sheep jobs. Apparently they were the best qualified in the swine enterprise since only 62 per cent had done less than half of the jobs in this enterprise, and only six per cent had not done any of the swine jobs.

Prospective teachers can acquire these fundamental farm skills by obtaining more farm experience and by taking courses in animal industry skills. The farm experience could be obtained by working on a farm during summers or during any time of the year necessary to acquire skills in animal husbandry that are seasonal in character. For example, if the student felt that he needed more abilities in caring for dams and offspring immediately before, after, and during parturition, he would need to be on the farm during the spring months.

Michigan State College offers the course Animal Industry Skills during the special three weeks summer session. This course is open to undergraduate students and teachers of vocational agriculture; however, it does not carry graduate credit. In the course, students do manipulative jobs dealing with the care, handling, and

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management of livestock including dairy cattle and poultry. It has been offered during six summer sessions since 1941. The demand for the course each time is indicative of a felt need by present and prospective teachers of vocational agriculture for acquiring skills in the livestock enterprises.

One function of technical departments in a collegiate school of agriculture is to provide pre-service and in-service education for teachers of vocational agriculture. In providing this training, there seems to be a feeling by some teachers of animal husbandry that teachers of vocational agriculture do not have an opportunity to take enough courses in animal husbandry in their undergraduate work. The same feeling might be said to exist among teachers in other technical departments of agriculture. During the time teachers included in the present study were undergraduates, a minimum of two courses was required in animal husbandry other than dairy and poultry courses.

There seem to be varied opinions as to what should be included in the two animal husbandry courses taken by majors in agricultural education. One belief is that these courses should deal with managerial jobs primarily; and that the prospective teacher should have the manipulative skills when he enters college or acquire them during the summers. Another factor to consider in deciding the content of courses in animal husbandry is the relative

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amount of necessary time to devote to the beef-cattle, sheep, and swine enterprises.

If there is a correlation between abilities possessed by teachers and jobs taught in the livestock enterprises, perhaps only those who are well qualified in animal husbandry should be selected to teach in important areas of livestock production. Knowing the field of major emphasis and technical qualifications of candidates is of value to administrators who are selecting teachers for localities where certain enterprises are important; and to those at the college who are responsible for nominating candidates for teaching positions in vocational agriculture.

The following are the summary statements of this part of the chapter: teachers in the field of general education need to be competent in the subjects taught; teachers need occupational ability in any vocational subjects taught; teachers of vocational agriculture need to be competent in technical agriculture; they need occupational ability in agriculture; and teachers of vocational agriculture need to possess the more important abilities and teach the more important jobs in livestock enterprises.

Some of these needs may be met by selecting prospective teachers who possess some of these abilities, by providing pre-service-education and in-service-education courses that will offer opportunities for teachers to acquire some of the abilities, and by

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selecting teachers for important communities of livestock production who possess the more important abilities in the livestock enterprises.

The Problem

Determination of the association of some factors with certain abilities possessed and jobs taught in beef-cattle, sheep, and swine enterprises by teachers of vocational agriculture in Michigan is the problem which constitutes the basis of the present study.

The study will include collecting, analyzing, and interpreting of data to:

(1) Determine the abilities in the beef-cattle, sheep, and swine enterprises possessed by teachers of vocational agriculture.

(2) Determine the jobs in these enterprises that have been taught to all-day classes and out-of-school classes in vocational agriculture.

(3) Determine whether number of credits in animal husbandry earned by teachers is associated with abilities in these enterprises possessed by teachers.

(4) Determine whether number of credits in animal husbandry earned by teachers is associated with jobs in these enterprises that have been taught to all-day and out-of-school classes.

(5) Determine whether number of years of teaching experience is associated with abilities in these enterprises possessed by teachers.

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(6) Determine whether number of years of teaching experience is associated with jobs in these enterprises that have been taught to all-day and out-of-school classes.

(7) Determine whether importance of livestock production, in counties where teachers are located, is associated with abilities in these enterprises possessed by teachers.

(8) Determine whether importance of livestock production, in counties where teachers are located, is associated with jobs in these enterprises that have been taught to all-day and out-of-school classes.

(9) Determine whether there is a difference between proportions of manipulative and managerial abilities possessed by teachers.

(10) Determine whether there is a difference between proportions of manipulative and managerial jobs that have been taught to all-day classes.

(11) Determine the correlation between abilities possessed by teachers and the jobs taught in each enterprise to all-day and out-of-school classes.

(12) Determine whether there is a difference in proportions of abilities among beef-cattle, sheep, and swine enterprises possessed by teachers.

(13) Determine whether there is a difference in proportions of jobs among these enterprises that have been taught to all-day classes.

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The results of this study should provide information pertaining to abilities possessed and jobs taught in beef-cattle, sheep, and swine enterprises that could be used in selection of students for prospective teachers, in pre-service and in-service education, and in selection and placement of teachers of vocational agriculture.

Basic Assumptions

The following basic assumptions were made:

(1) Teachers of vocational agriculture possess some abilities in the beef-cattle, sheep, and swine enterprises; and they teach some jobs in each of these enterprises.

The large number of productive projects in the livestock enterprises that were mentioned in the first part of the chapter were supervised by these teachers. The supervision of these projects would indicate that the teachers possessed some abilities and taught some jobs in the livestock enterprise.

(2) The survey procedure and the questionnaire technique are reliable methods of securing data to be used in the present study.

About 90 per cent of the 757 research studies in agricultural education that are listed in the first two publications prepared by a committee of the American Vocational Association in cooperation

with the United States Office of Education, involved the use of survey procedures.[33]

According to Teeps, the questionnaire technique has been widely used in education and other fields:

> The questionnaire has been extensively used as a means of collecting data, especially in the fields of school administration and the curriculum. It obviously is an indispensable means of collecting such data as school enrollments, salaries, subject matter combinations of high-school teachers, duties of administrators, administrative practices of schools, and curricular offerings. It is also employed to obtain expressions of attitudes, opinions, judgments, and "morale". Outside of the field of education the questionnaire is used widely by social and governmental agencies, newspapers, business organizations, and the like to obtain various kinds of information.[34]

(3) A jury of staff members in agricultural education and animal husbandry can determine the more important abilities in the beef-cattle, sheep, and swine enterprises; also they can determine the more important jobs in these enterprises.

According to Greene, Jorgensen, and Gerberich,[35] the methods of determining validity are; curricular, statistical, and psychological and logical. Of these three, curricular validity is considered to be far the most important one. By this method, specialists in the

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[33] Herbert M. Hamlin and George P. Deyoe, "Agricultural Education," Encyclopedia op. cit., p. 37.

[34] Herbert A. Teeps, "Questionnaires," Encyclopedia op. cit. p. 948.

[35] Harry A. Greene, Albert N. Jorgensen, and J. Raymond Gerberich, Measurement and Evaluation in the Secondary School, (New York: Longmans, Greene and Co., 1944) pp. 54-55.

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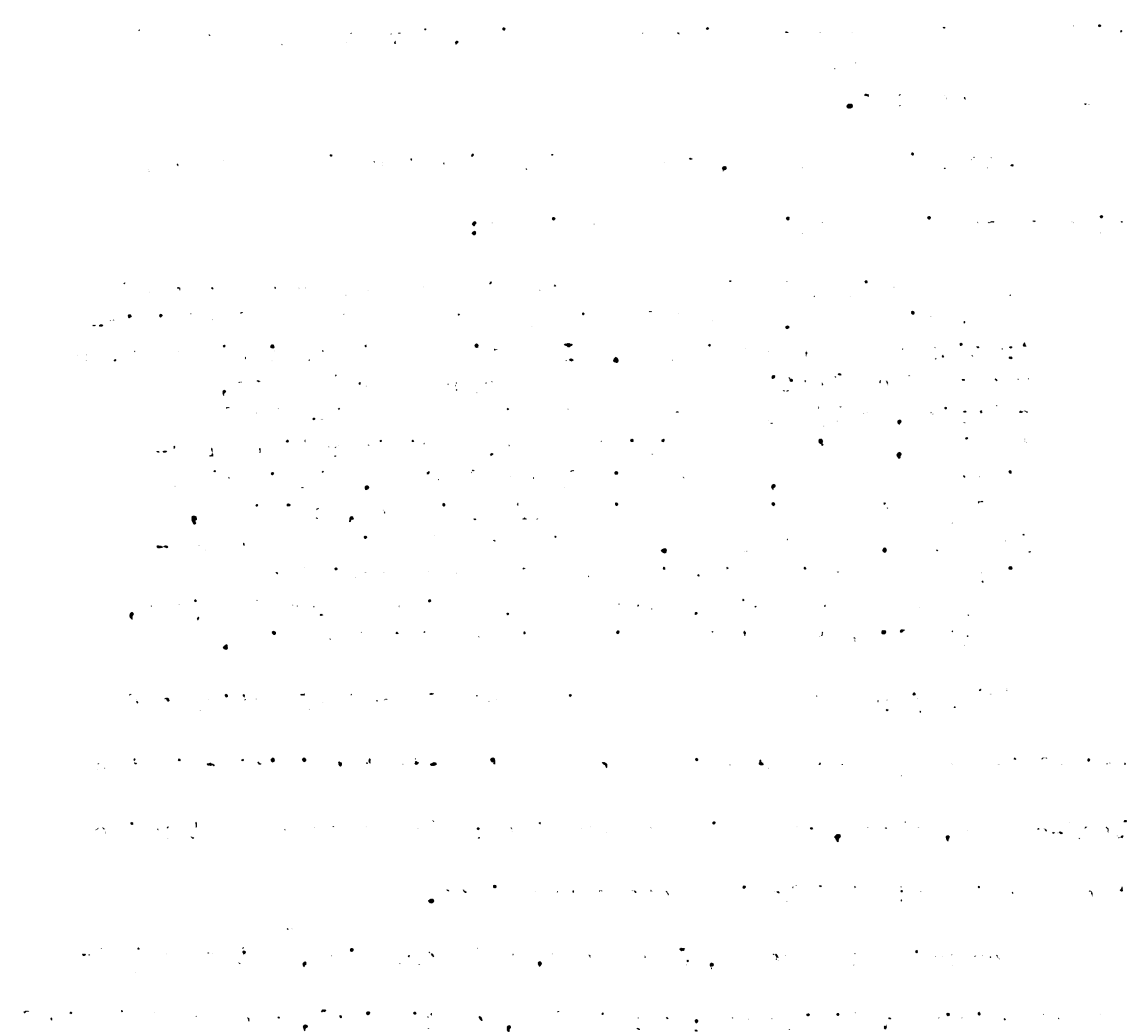

field determine the validity of the test or material in a check-list. Wrightstone[36] agrees that this is an important method of determining validity. He indicates that there should be from three to 22 independent judges to determine validity.

As will be discussed in chapter three, one method of determining the validity of the check-list used in the present study was to submit it to 10 staff members in agricultural education and animal husbandry at Michigan State College.

(4) The check-list used in the present study is a reliable instrument for measuring the more important abilities in the live-stock enterprises possessed by teachers of vocational agriculture, and the more important jobs taught in these enterprises.

The measurement involves the accuracy and consistency of the answers of those responding to a check-list. By analyzing data on check-lists that had been submitted to eight representative teachers of vocational agriculture in Michigan, a correlation coefficient of .994 was obtained. The correlation coefficient, which is statistically significant, indicates a fairly high degree of accuracy and consistency of the items in the check-list. The method of solving for the correlation coefficient is described in chapter three.

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[36] J. Wayne Wrightstone, "Rating Methods," Encyclopedia op. cit., p. 962.

(5) The reliability of the sampling of teachers is assumed.

Scope of the Study

This part of the chapter will describe the teachers, designate the area of technical agriculture, and indicate the types of abilities and jobs included in the study.

Teachers. The teachers were those who met the following criteria:

(1) They graduated from Michigan State College between 1937 and 1946.

Only graduates of Michigan State College were included because graduates of other institutions might have met different requirements in animal husbandry. The minimum amount of credits required in animal husbandry in the curriculum in agricultural education at Michigan State College has remained constant during this period of time. For any of these teachers to have taught at least three years, they would have had to graduate not later than 1946.

(2) They had taught vocational agriculture at least three years.

A minimum of three years of teaching is a requirement for a permanent vocational certificate in Michigan. If a person has taught vocational agriculture for three years, he may be considered to be somewhat permanent in the profession. In some schools, Vocational Agriculture I is alternated with Vocational Agriculture II;

and Vocational Agriculture III is alternated with Vocational Agriculture IV. If he had not taught three years, the teacher might not have had occasion to teach all of the jobs included in the check-list.

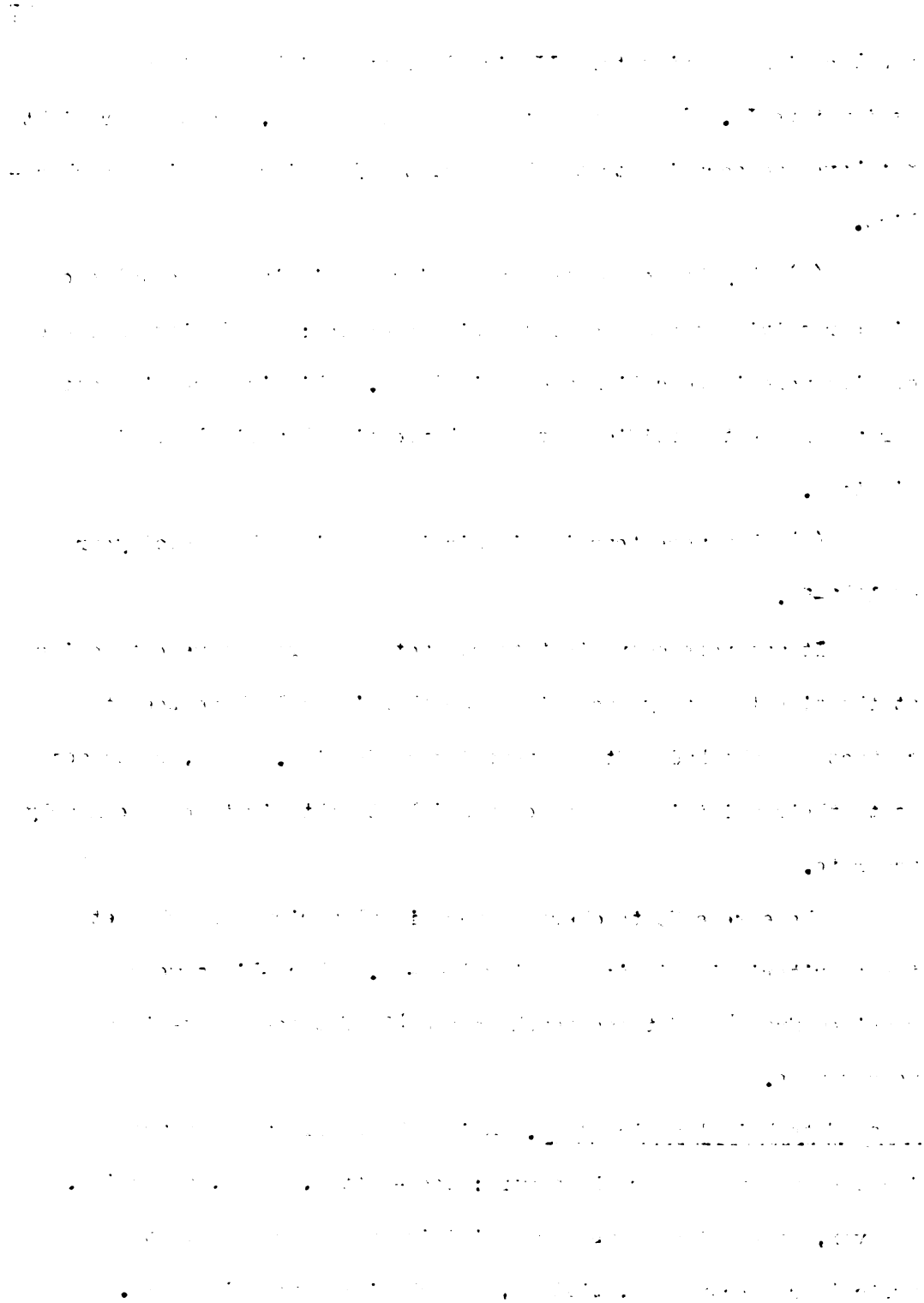
(3) They had completed 15 credits at Michigan State College since receiving the Bachelor of Science degree; a majority of these credits were in education and agriculture. This is a requirement for a permanent certificate to teach vocational agriculture in Michigan.

(4) They were teaching in Michigan during the school year of 1949-50.

It was more convenient to contact teachers who were teaching at the time the study was being made than it would have been to contact men who had left the teaching profession. Also, responses as to their abilities possessed and jobs taught might be more nearly accurate.

There were 50 teachers of vocational agriculture who met these criteria in Michigan during 1949-50. Check-lists were received from 45 of these teachers and 45 of these check-lists were usable.

Area of technical agriculture. Animal husbandry was the area included and the enterprises were: beef-cattle, sheep, and swine. However, some animal husbandry abilities and jobs related to agricultural economics, biology, and chemistry were included.



Types of abilities and jobs. Manipulative abilities and managerial abilities possessed by teachers in these enterprises were included. The more important manipulative jobs and managerial jobs taught in these enterprises to all-day and out-of-school classes were included.

Limitations of the Study

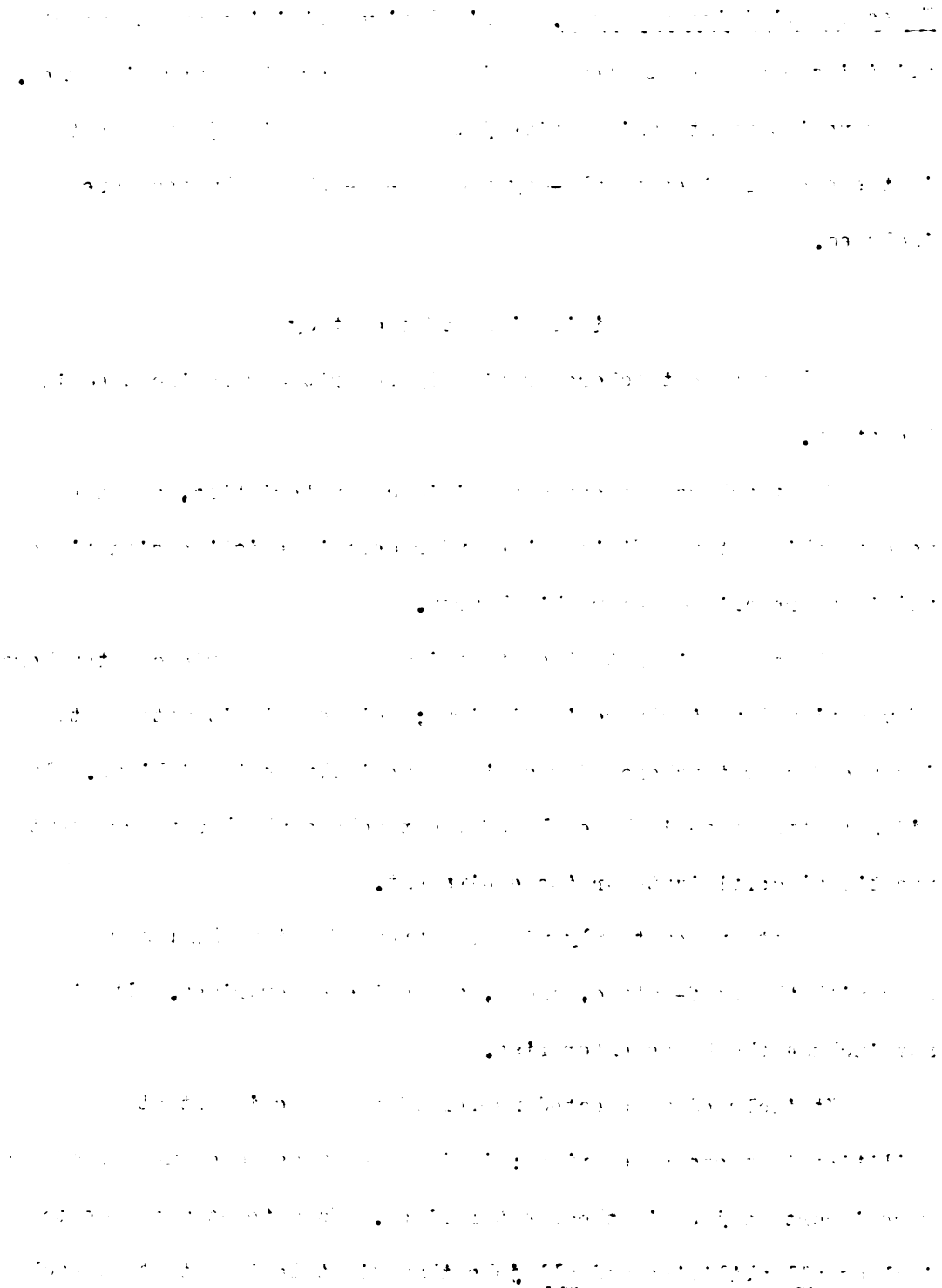
Only the 45 teachers previously described were included in the study.

The teachers possessed specific characteristics, and they were teaching at a definite time under certain existing situations and in a prescribed geographical area.

The study did not attempt to include all experienced teachers of vocational agriculture in Michigan; neither did it attempt to include former teachers of vocational agriculture in Michigan. It did not attempt to include all of the teachers who had a permanent vocational certificate or its equivalent.

The study dealt only with the area of animal husbandry and only with the beef-cattle, sheep, and swine enterprises. It did not include the horse enterprise.

It included a selected number of the more important abilities in these enterprises; it included a selected number of the more important jobs in these enterprises. No attempt was made to include all abilities and all jobs that might be important to each



enterprise. It would be very difficult to determine when and if an all-inclusive list of abilities and jobs has been formulated. Also, there would probably be considerable disagreement among specialists as to what constitutes such a list of abilities and jobs.

This study made no attempt to evaluate the quality of the abilities possessed by the teachers in the beef-cattle, sheep, and swine enterprises. It dealt only with the quantity of the abilities. It would be difficult and complicated to formulate terms, in a questionnaire, by which teachers might indicate the quality of their abilities in these enterprises.

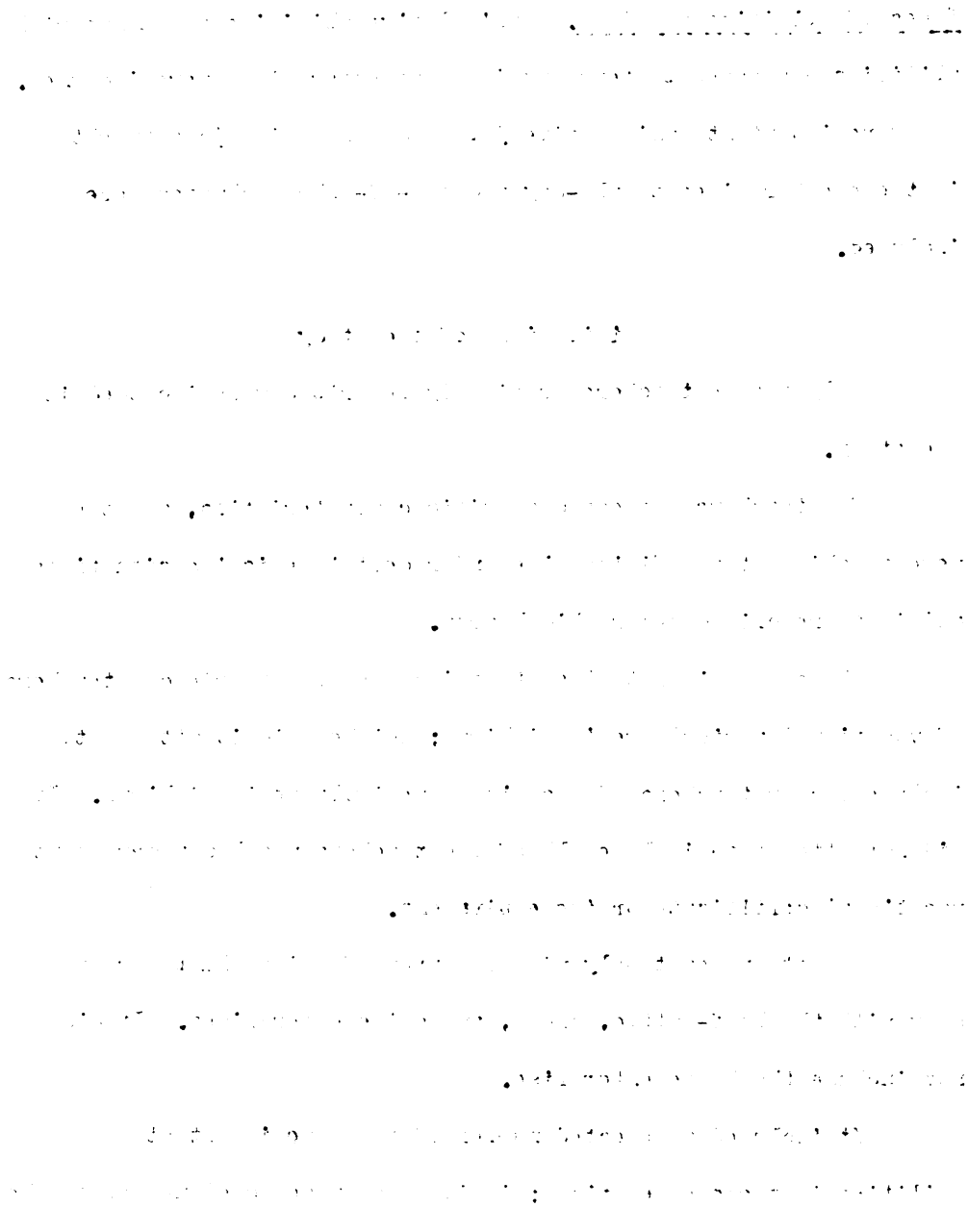
No attempt was made to evaluate the quality of the teaching of jobs in these enterprises. It dealt only with the quantity of jobs. It would be very difficult to obtain an evaluation of the quality of teaching, in comparable terms, from each of the teachers.

It did not include professional abilities of teachers that were necessary for teaching these enterprises or any other enterprises. It dealt only with technical abilities.

Definitions of Terms Used

Vocational Agriculture A program of instruction in agriculture offered in the public high schools in accordance with the provisions of the National Vocational Education Acts.

Supervised Farming The farming activities of an educational nature conducted by the students enrolled in vocational agriculture and supervised by the teacher of vocational agriculture.



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Supervised Farming The farming activities of an educational nature conducted by the students enrolled in vocational agriculture and supervised by the teacher of vocational agriculture.

Approved Practice An agricultural practice which has been tested by the state agricultural college and has been recommended as being of superior merit.

All-day Classes Classes in vocational agriculture for students who are regularly enrolled in a high school.

Young-farmer Classes Classes in agriculture conducted in the departments of vocational agriculture for young farmers, usually between the ages of 16 and 25 years, who are not enrolled in any other school, and who are in the process of becoming established in farming.

Adult-farmer Classes Classes in agriculture conducted in the departments of vocational agriculture primarily for persons who are established in farming and who are usually 26 years of age or older.

Out-of-school Classes Classes in agriculture conducted by the departments of vocational agriculture for adult farmers and/or young farmers.

Area of Technical Agriculture A division of the field of agriculture dealing with closely related activities, e.g. horticulture, soils, poultry.

Subject Matter Specialist A person, in a technical department of the School of Agriculture, who works primiarly with one enterprise in the department, e.g. a swine specialist in the department of animal husbandry.

Enterprise One phase of an area of technical agriculture, e.g. sheep in the area of animal husbandry, small grains in the area of farm crops.

More-important County of Livestock Production A county in Michigan in which 19.89 per cent or more of the total farm income was derived from beef-cattle, sheep, and swine enterprises according to the U.S.D.A. census of 1945.

Permanent Vocational Agriculture Certificate A certificate issued after the issuance of a provisional vocational certificate and upon the successful completion of three years as a teacher of vocational agriculture, the completion of 15 credits after receiving the B.S. degree, the majority of which must be in agriculture and agricultural education, and the recommendation of the superintendent of schools where the teacher is located and of the sponsoring institution.

Fully-qualified Teacher A teacher of vocational agriculture who has a permanent vocational certificate valid in Michigan, or who has completed the requirements for such a certificate.

Manipulative Jobs These jobs in agriculture which require primarily physical action to complete, e.g. docking lambs, dehorning cattle, ringing pigs.

Managerial Jobs Those jobs in agriculture which require primarily decision making to complete, e.g. marketing swine for the most economical returns, selecting ewes for flock replacement.

Manipulative Abilities The abilities necessary to perform the manipulative jobs in agriculture.

Managerial Abilities The abilities necessary to do the managerial jobs in agriculture.

Type of Abilities The manipulative abilities or managerial abilities included in the enterprise.

Type of Jobs The manipulative jobs or managerial jobs included in the enterprises.

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CHAPTER II

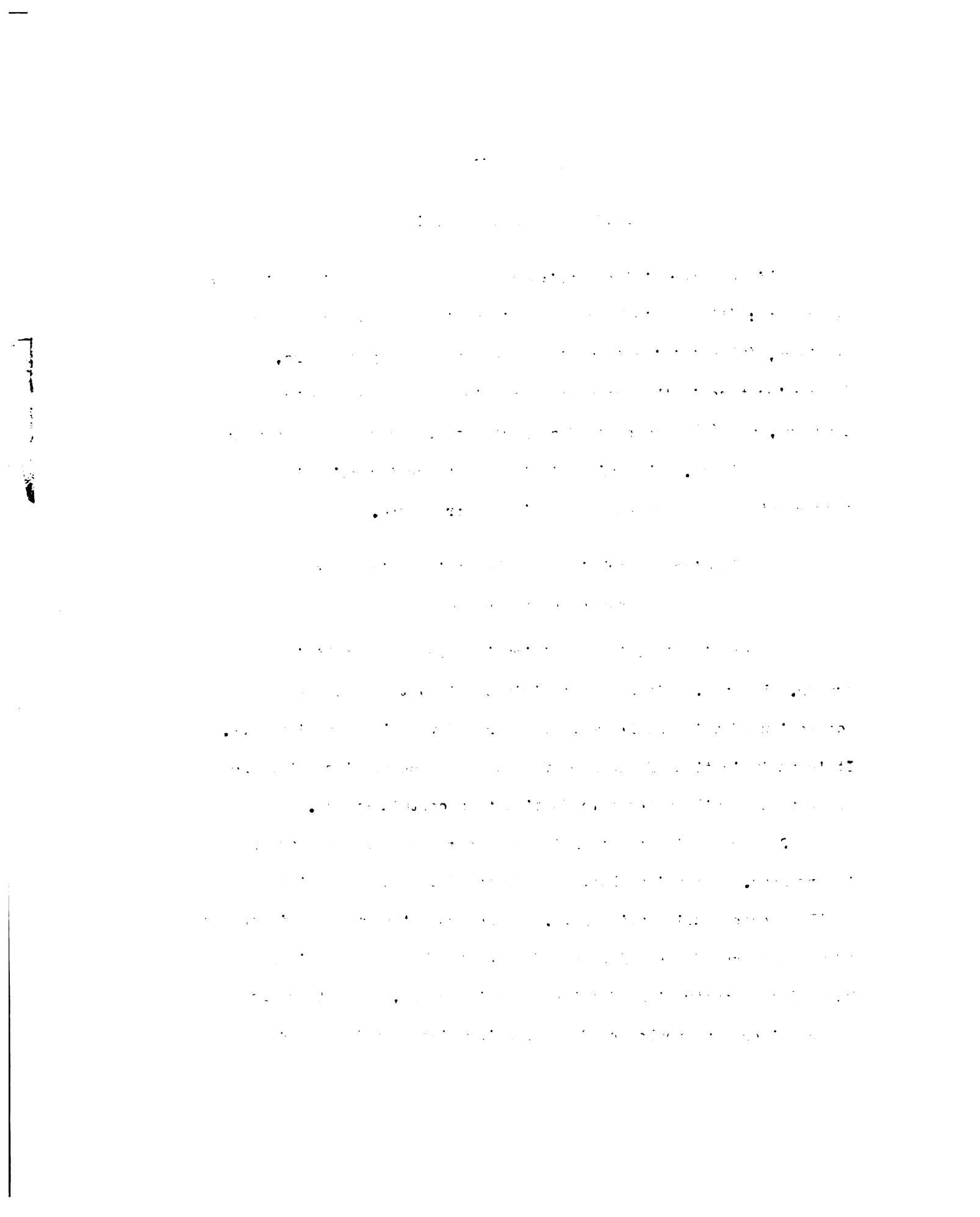
REVIEW OF RELATED STUDIES

This chapter will summarize some results of studies which are related to: (1) technical knowledge in agriculture possessed by teachers, (2) abilities in agriculture possessed by teachers, (3) agriculture in the preparatory curriculum for prospective teachers, and (4) knowledge of subject matter possessed by teachers of other subjects. The major findings of these investigations as they relate to the present study will be presented.

Studies of Technical Knowledge in Agriculture Possessed by Teachers

The studies in this classification are somewhat limited in number. However, this does not limit the importance of the possession of this knowledge by teachers of vocational agriculture. It is an indication of the need for more of such studies which the present study will attempt to fulfill to a certain extent.

Parker studied the technical knowledge of 71 negro teachers in Arkansas. The animal husbandry phase of the study consisted of 11 selected manipulative jobs. He reported the range of importance of a knowledge of these jobs was from 60 teachers who considered a knowledge of castration of swine to be important, to 69 teachers who considered a knowledge of controlling lice on swine to be



important.[1] Parker found the range in need for further training in animal husbandry to be from 55 teachers who indicated a need for more training in controlling common diseases of cattle, to 68 teachers who indicated a need for more training in vaccination of cattle. Very few of these teachers indicated that their teaching of these jobs would be effective without previous training; 16 of them indicated that they could do an excellent job of teaching castration of swine without previous training. Only three teachers indicated that they could teach control of diseases of cattle without previous training. At the other extreme, 58 of the 71 teachers indicated that they would do poor teaching of this job without previous training. These teachers rated the importance of a knowledge of animal husbandry as fifth in seven groups of jobs in technical agriculture.[2]

The study made by Parker attempted to determine the problems in technical agriculture encountered by teachers of vocational agriculture, the importance of these problems, and the need of

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[1] Sellars J. Parker, "The Implications of Selected Problems in Teaching Vocational Agriculture for Placing Emphasis on the Content of the Teacher-Training Program at the Agricultural Mechanical and Normal College in Arkansas," (unpublished Doctor's dissertation, Cornell University, Ithaca, New York, 1949) p. 107.

[2] Ibid., pp. 111-113.

further training of teachers in these problems. The importance of these problems and the need of further training of teachers was indicated merely by opinions of teachers. The present study endeavors to determine the jobs that teachers can do and the importance of these jobs, by asking teachers to indicate the jobs that they have done and these that they have taught.

A study of abilities in technical agriculture possessed by 25 seniors in agricultural education at Ohio State University was made by Rhead. He reported that the trainees scored 39.6 per cent in ability to make managerial decisions in the swine enterprise.[3] The score of these prospective teachers was not compared with the scores of any other group of prospective teachers or present teachers in their abilities to make managerial decisions. No study was made of factors related to managerial abilities as the present study proposes to make. Though only one enterprise in animal husbandry was included in the technical-knowledge phase of the Rhead study, it was based on a fairly comprehensive check-list which had been approved by specialists in animal husbandry at the state university. The study by the writer will include the three most important

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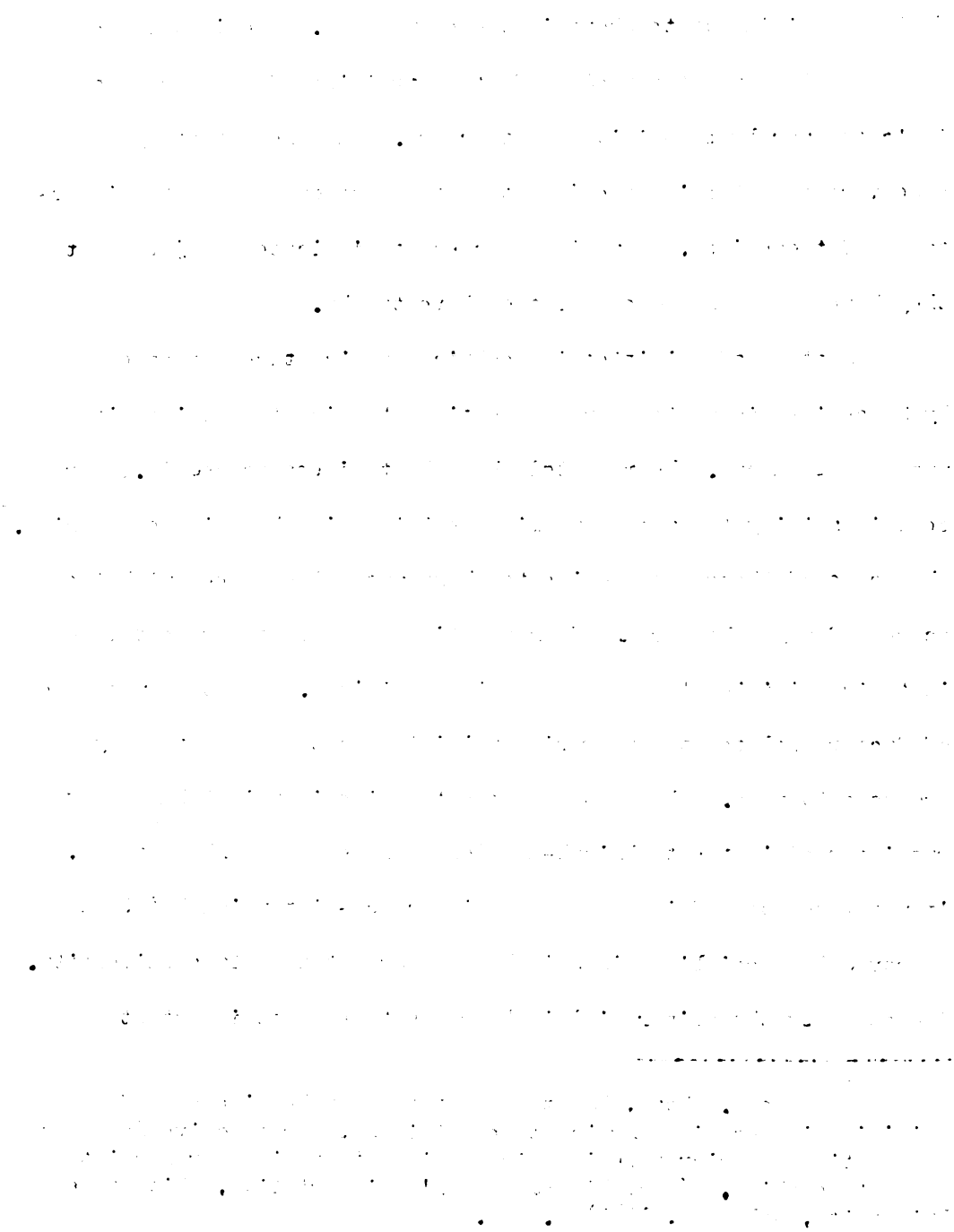
[3] Claude E. Rhead, "A Study of the Comprehensiveness of Abilities in Technical Agriculture Attained by Prospective Teachers of Vocational Agriculture in Ohio Previous to their Entrance into Student Teaching." (unpublished Doctor's dissertation, Ohio State University, Columbus, 1943) p. 223.



enterprises in livestock production in Michigan.

Studies of Abilities in Agriculture Possessed by Teachers

Seemingly, more studies have been made regarding abilities in agriculture possessed by teachers than studies pertaining to technical knowledge in agriculture possessed by teachers.

As reported by MacDonald, nine of 38 teachers in Montana indicated that they could do 75 per cent or more of the manipulative jobs in the swine enterprise. Fifteen of these teachers indicated that they could do 75 per cent or more of the jobs in the sheep enterprise, and 16 of them indicated that they could do 75 per cent or more of the jobs in the beef cattle enterprise. Thirty-three teachers reported that they could do 75 per cent or more of the jobs in the farm mechanics enterprise, and 21 teachers reported that they could do 75 per cent or more of the jobs in the horse enterprise.[4] It is interesting to note that a much greater number of teachers reported that they could do 75 per cent or more of the jobs in the farm mechanics and horse enterprises than in any of the other enterprises.

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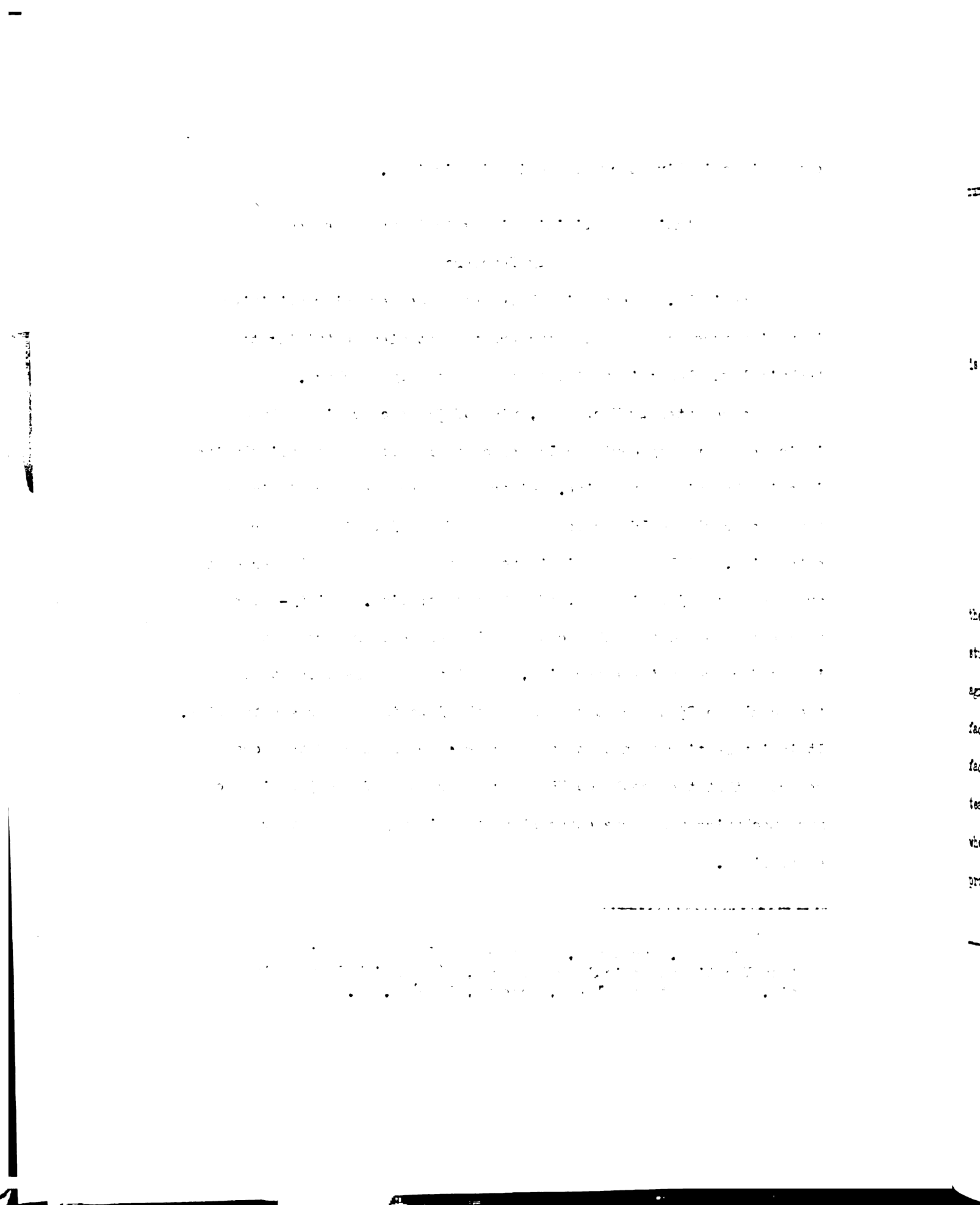
[4] Donald L. MacDonald, "Some Needed Improvements in the Montana Vocational Agriculture Program," (unpublished Master's thesis, Montana State College, Bozeman, 1939) p. 22.



The ability to do jobs in all enterprises according to the number of years of teaching was reported by MacDonald as follows:

> . . . assuming the teachers with eight years or more as 100 per cent, then teachers with four to seven years of experience scored 96 per cent and teachers with one to three years experience scored 73 per cent.[5]

The lack of abilities of teachers of vocational agriculture is summarized by MacDonald as follows:

> Teachers do not generally know how to do enough of the basic skills which they should teach, according to the survey of teachers' abilities. It has been shown that the agricultural teacher on graduating from college is unable to do many of the farm skills. Men who have taught three years or more have "picked up" many of the skills but they are still, on the whole, quite week in this respect.[6]

This study dealt with manipulative abilities only, whereas the present study will also include managerial abilities. The above study made no mention of the jobs taught to classes in vocational agriculture. Only one influencing factor was considered, this factor being the number of years of teaching by teachers. Other factors such as amount of credits in animal husbandry possessed by teachers, and importance of livestock production in communities where teachers were located, were not included in the study as is proposed in the present study.

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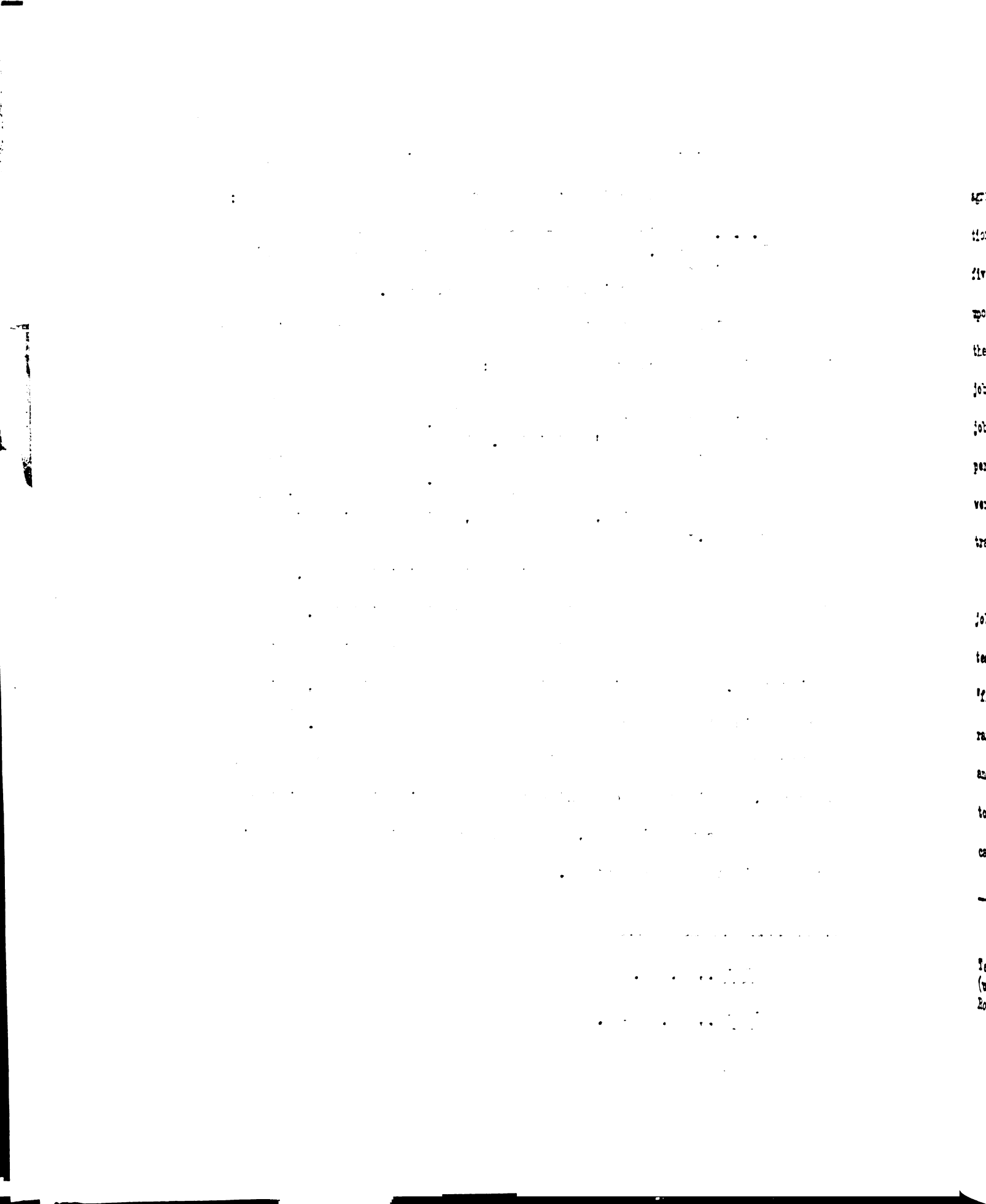
[5] Ibid., p. 23.

[6] Ibid., pp. 50-51.



Approximately 90 per cent of 161 teachers of vocational agriculture in Louisiana rated each job in general livestock production as essential according to a study conducted by Harper. Seventy-five per cent of these teachers reported that they had been called upon to use or teach every job listed in the livestock section of the survey, except the use of the emasculator. There were seven jobs listed in the general livestock group, or an aggregate of 1,127 jobs that could have been checked by all teachers. Of these jobs, 97 per cent were checked as essential by the teachers, 81.5 per cent were reported as used or taught, and teachers indicated inadequate training in 30.4 per cent of the jobs.[7]

There were 23 jobs in the beef and dairy-cattle group, five jobs in the sheep group, and seven jobs in the swine group. The teachers ranked these jobs by enterprises as to: "being essential", "frequency used or taught", and "need for further training." The rank of enterprises as to "being essential" was as follows: beef and dairy cattle, swine and sheep. The enterprises ranked according to "frequency used or taught" as follows: swine, beef and dairy cattle, and sheep. As to "need for further training by teachers",

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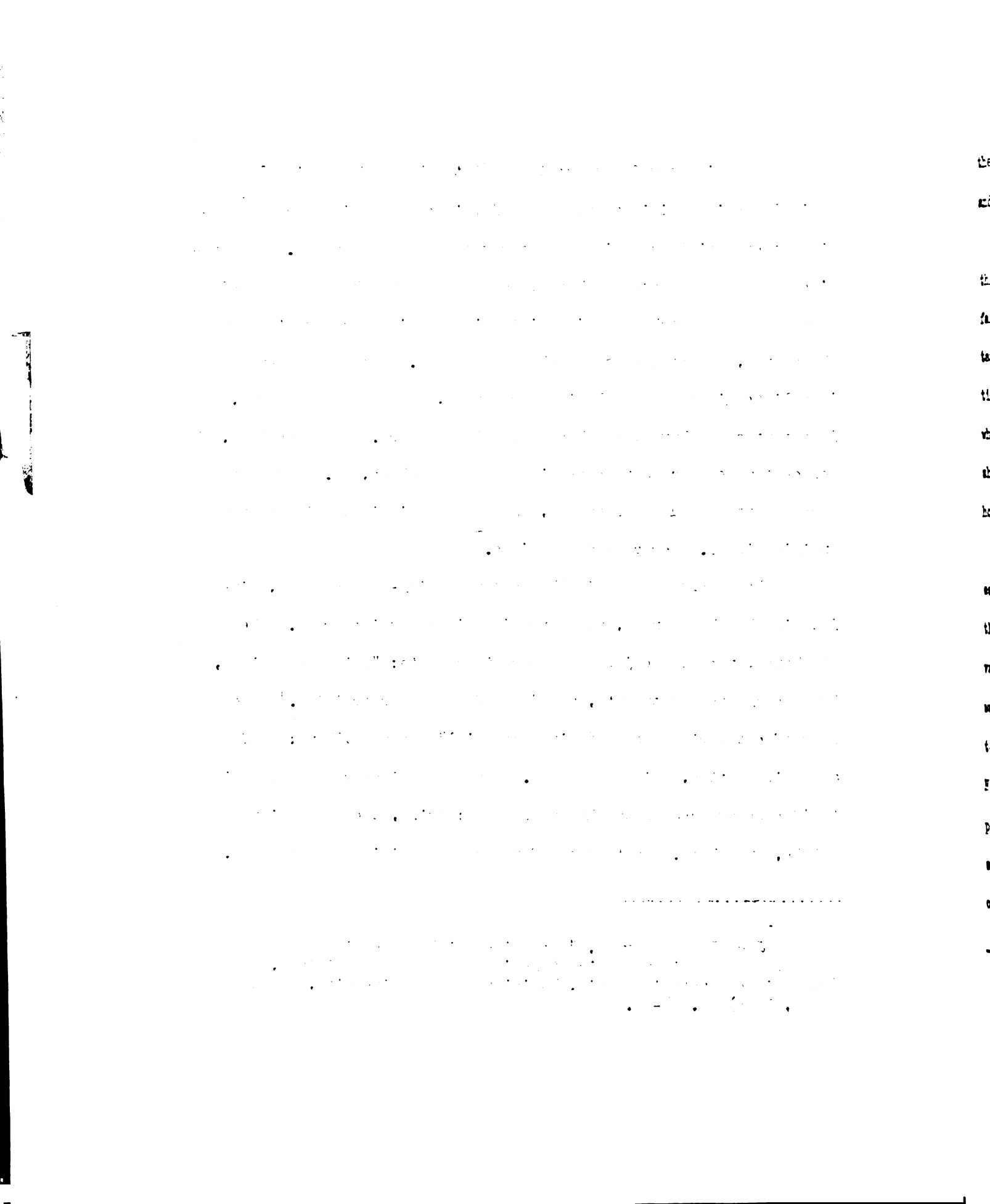
[7] Jack London Harper, "Operative Skills Essential to the Teachers of Vocational Agriculture in the State of Louisiana," (unpublished Master's thesis, Louisiana State University, Baton Rouge, 1945) pp. 34-36.



the enterprises were in this order; sheep, beef and dairy cattle, and swine.[8]

The teachers also ranked the importance of areas of jobs in this order: food preservation, livestock and poultry, horticulture, farm shop, and field crops. The frequency with which they were taught or used was: horticulture, livestock and poultry, food preservation, farm shop, and field crops. The rank of areas of jobs in which teachers reported needing more training was as follows: farm shop, food preservation, field crops, livestock and poultry, and horticulture.[9]

This is another study based largely on opinions of teachers, especially in indicating importance of jobs. However, it did include the use of jobs and an indication of jobs taught. There was a variation in number of years that teachers had taught, but no study was made of the relation of this factor to abilities possessed by teachers or jobs they taught as will be done in the present study. No analysis was made of other factors in relationship to abilities possessed by teachers and jobs taught by these teachers. The study indicated that the need for more training was based on opinions of teachers only, and not on whether they had performed the jobs.

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[8] Ibid., pp. 37-42.

[9] Ibid., pp. 83-84.

In the present study these needs for more training will be based on responses to the implied question, "Have you performed the job and can you demonstrate the job?" In Harper's study the teachers were not asked to indicate the jobs that they could do as was done in the present study.

A study of technical difficulties encountered by beginning teachers of vocational agriculture in Tennessee was made by Kirkland during 1943-44. Teachers who had taught from one to six years were asked to check one of the following: no difficulty in performing, can perform, difficulty in performing, or cannot perform. From the summary of these findings it was found that the per cent of teachers who had no difficulty in performing all activities in the enterprises were: swine, 43.9; beef and dairy cattle, 37; and sheep, 24.2. The per cent of teachers who could perform activities in the different enterprises were: sheep, 53.6; beef and dairy cattle, 43.4; and swine, 40.9. The per cent of teachers who had difficulty in performing and could not perform the activities were: sheep, 22.2; beef and dairy cattle, 19.6; and swine, 15.2.[10] From these per cents it can be seen that teachers indicated they were the best

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[10] James B. Kirkland, "A Study of the Professional and Technical Difficulties Encountered by Teachers During Their First Year of Teaching Vocational Agriculture," (unpublished Doctor's dissertation, Ohio State University, Columbus, 1947) pp. 135-144.

qualified to do swine activities and the least qualified to do sheep activities.

Even though the study by Kirkland was to determine some difficulties encountered by beginning teachers, some of the teachers included in the survey had taught as many as six years. The responses from teachers who had taught more than one year might not be indicative of the difficulties encountered by first-year teachers. This study dealt with opinions, and particularly opinions in which the degree of performance was involved which would be very difficult to measure. No mention was made of the jobs that were taught. No study was made of any factors that might have been related to the abilities that the teachers indicated they possessed.

In a study mentioned in a previous section, Rhead revealed that the trainees' range of individual scores in per cent of manipulative abilities that they possessed were: beef and dairy cattle, 12 to 84; sheep, 0 to 75; and swine, 0 to 74. The average scores in per cent made by the trainees in abilities possessed in the different enterprises were: beef and dairy cattle, 41; swine, 38.5; and sheep, 22. The average score for all areas of livestock was 38.5 as contrasted with an average score of 51.01 per cent for the trainees in all technical areas in agriculture in the study.[11]

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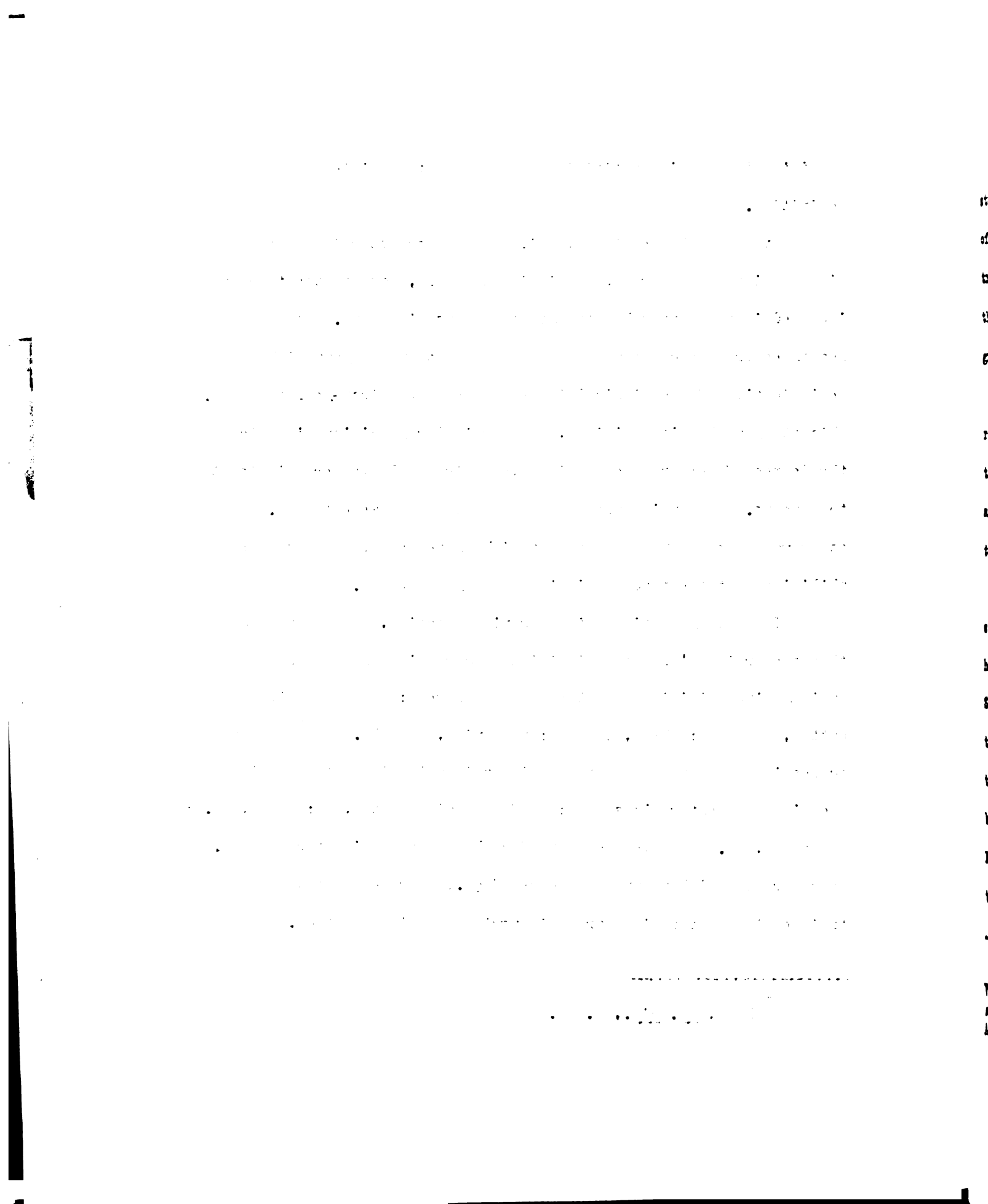
[11] Rhead, op. cit., p. 65.



There is only one important finding in the phase of the study dealing with manipulative abilities. This finding is the rank of enterprises according to the per cent of abilities that the trainees possessed in each enterprise. No analysis was made as to the significance of this rank or of the causes of this rank of groups of abilities.

Even though most of the study made by Sullivan is not directly related to the present study, a few of the findings are given because the survey technique was used and the "Farm Buildings and Sanitation" and "Feed Processing Facilities" phases of Farm Mechanics are related to livestock enterprises.

Of the 40 teachers of vocational agriculture included in the study made by Sullivan, 60.6 per cent of them indicated that they had adequate training in jobs included in the Farm Buildings and Sanitation unit. They devoted an average of 22.7 per cent of the time allocated to Farm Mechanics, to the Farm Buildings and Sanitation unit. The teachers rated the job "construction of farm buildings" as desirable. The "Feed Processing Facilities" phase of Farm Mechanics was not included in the questionnaire sent to teachers.[12] Concerning this phase of Farm Mechanics, Sullivan makes

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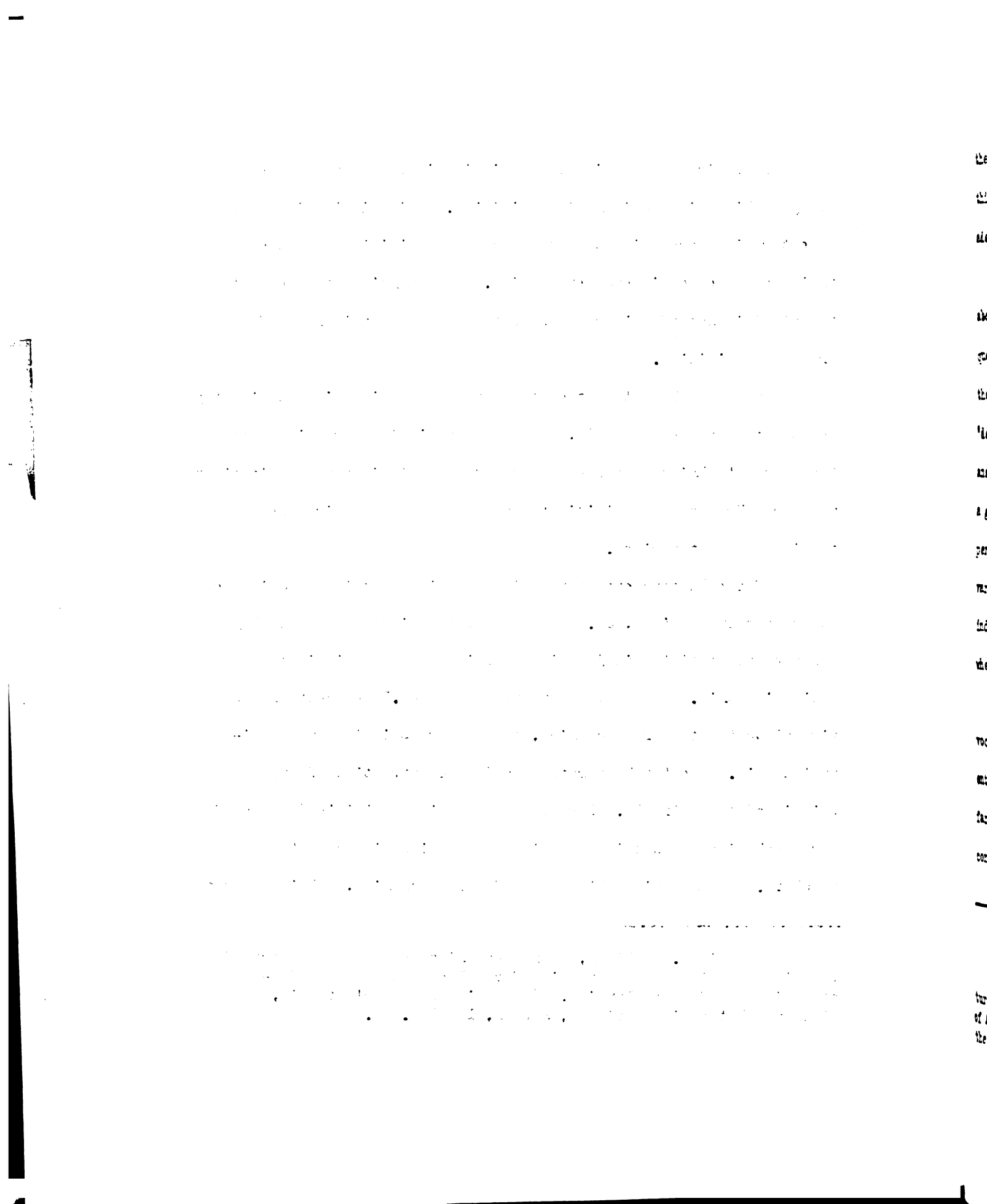
[12] Archie W. Sullivan, "Farm Mechanics Needs for Teachers of Vocational Agriculture as a Guide for College Curriculum Construction and Course Planning," (unpublished Master's thesis, Alabama Polytechnic Institute, Auburn, 1948) p. 50.



the following statement in his conclusions, "It is assumed that one-third or more of the teachers of agriculture in service have inadequate training in Food Processing Facilities."[13]

For each of the jobs included in the questionnaire in the above study, the teachers were to write Yes or No in answer to the question, "Do you have adequate training for this job?" For each of these jobs, the teachers were to indicate A as "essential", B as "desirable", C as "would not matter" or D as "would not be needed", in answer to the question, "How do you rate this job with reference to a good shop program?" This study was based on opinions of teachers pertaining to the adequacy of their training and the importance of various jobs; the element of degree of importance was involved. No indications were given as to whether teachers could do the jobs or whether the jobs were taught.

In making a study of farming abilities of 107 teachers of vocational agriculture, Shoptaw[14] arranged 299 abilities by the enterprises of beef production, crop production, milk production, farm economics and farm management, farm mechanics, forestry and conservation, fruit and garden production, horses and mules, poultry

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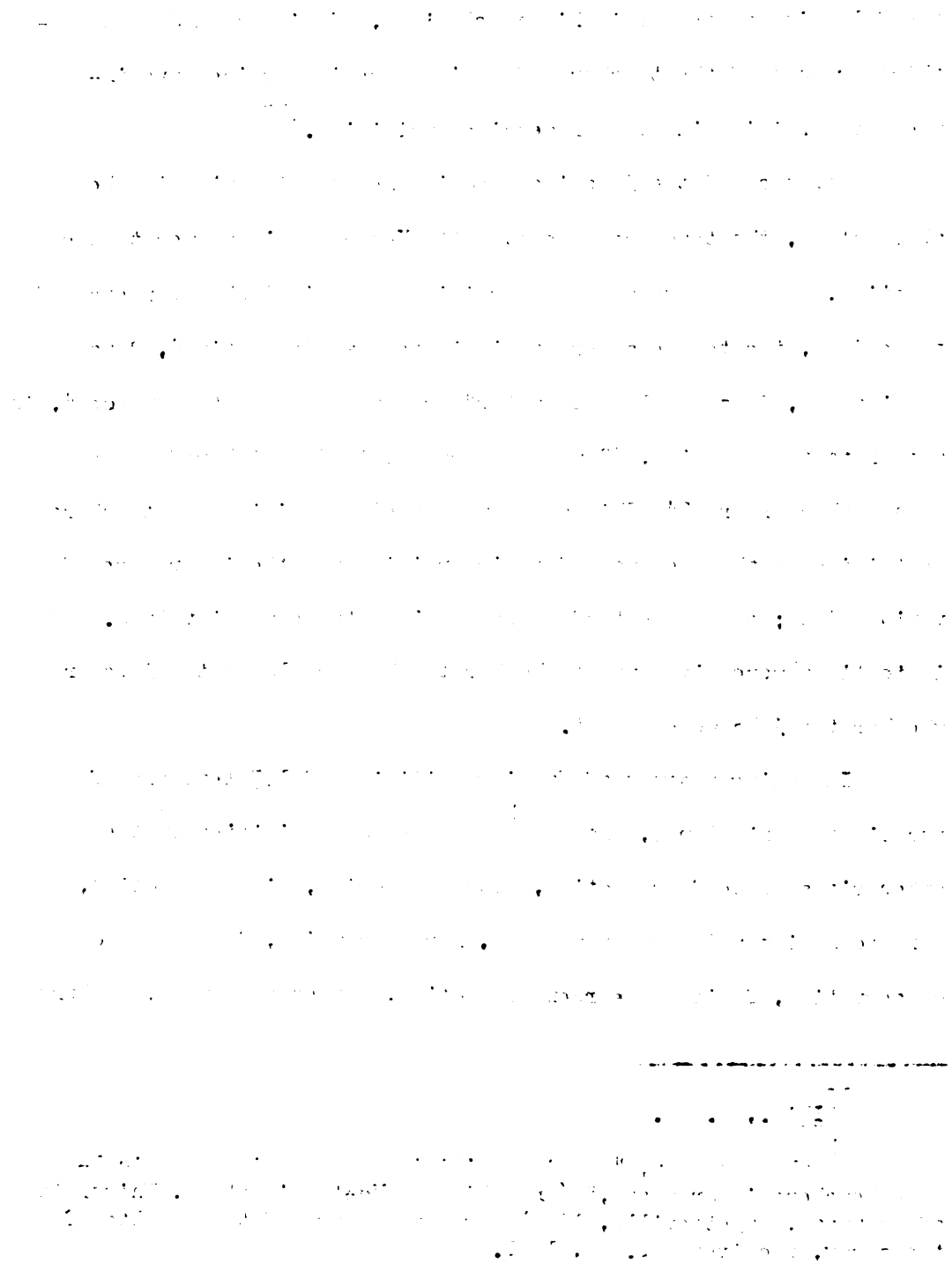
[13] Ibid., p. 56.

[14] LaVan Shoptaw, "Farming Abilities of Vocational Agriculture Teachers in Arkansas," (unpublished Masthesis study, University of Arkansas, Fayetteville, 1947) From a summary of the results of the study, received Feb. 28, 1951.

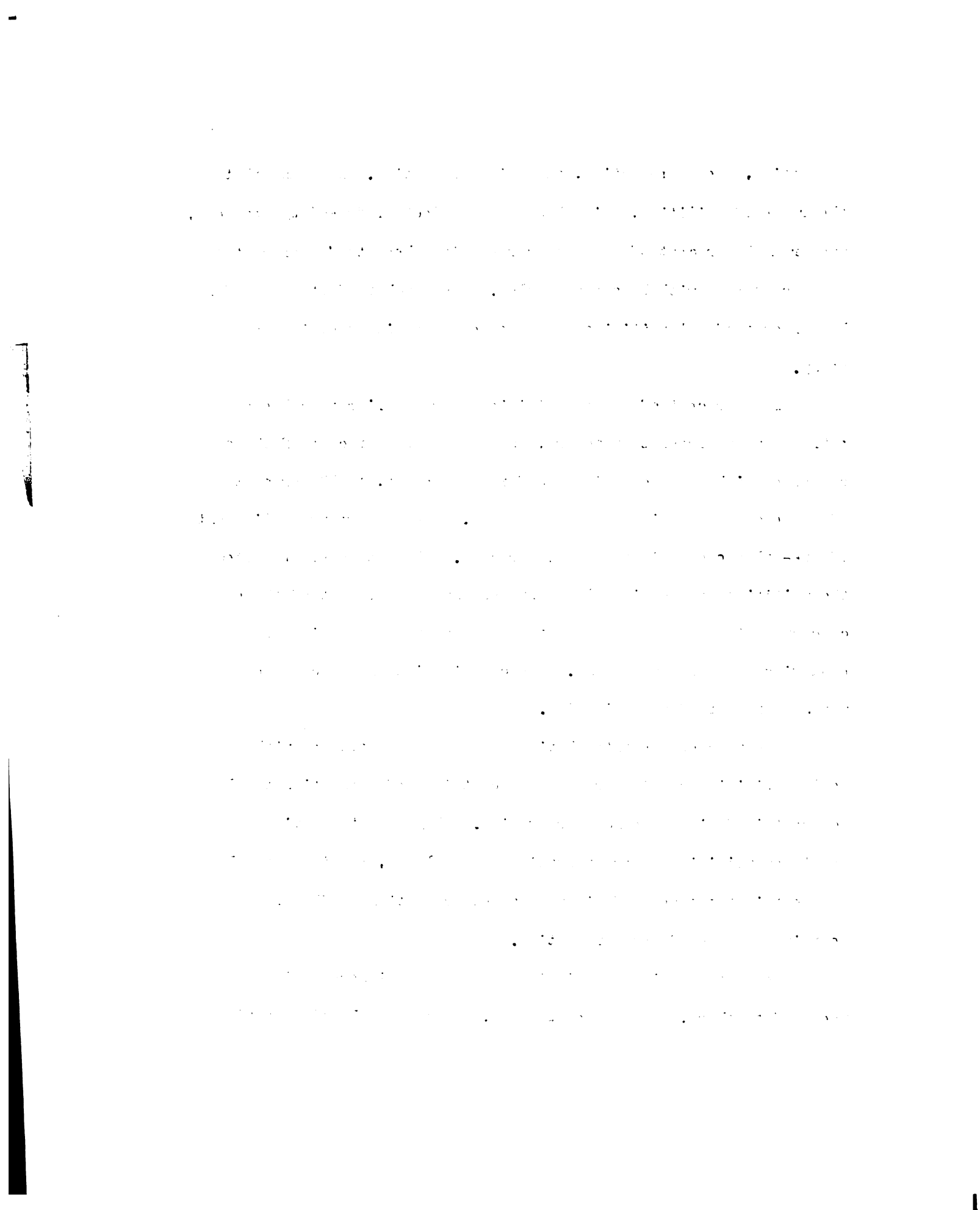


production, sheep production, and swine production. He found that the range of abilities, which had been "needed" or "used" by teachers, was from 27 per cent of those concerned with sheep to 86 per cent of those concerned with horses and mules. The teachers felt a need for 72 per cent of all abilities of the enterprises included in the study.

The per cent of needed abilities learned prior to college entrance as reported by teachers, ranged from 10 per cent of those concerned with farm economics and farm management, to 57 per cent of those concerned with horses and mules. The average accomplishment of pre-college experience was 30 per cent. These teachers reported the abilities learned in college ranged from 10 per cent of those concerned with horses and mules to 45 per cent of those in farm economics and farm management. The contribution of the college was 28 per cent of all abilities.

The teachers reported having graduated from college with needed abilities ranging from 43 per cent in beef production to 73 per cent in fruit and garden production. They reported having developed abilities after graduating from college, ranging from 27 per cent in the case of fruit and garden production to 57 per cent in the case of beef production.

Results of this study indicated that the difference in needs of teachers, as reported by them, between the 72 "judgment"



abilities and the 227 "manual" skills was insignificant. Manual skills were developed more commonly before entering college, according to the teachers, while judgment abilities were developed more commonly in college.

The relationship of one factor only and abilities possessed by teachers was considered in this study; that factor being the time of acquiring abilities.

Studies of Agriculture in the Preparatory Curriculum for Prospective Teachers

There is considerable variation in the amount of credits in animal husbandry that prospective teachers of vocational agriculture are required to take in different teacher-training institutions. Also, the amount of these credits taken by trainees at the same institution varies considerably.

Couch found that of 110 teachers reporting in New York, 13.63 per cent had 2-7 semester hours in animal husbandry, 39.09 per cent of them had 8-13 semester hours, and 47.27 per cent had 13 or more semester hours in animal husbandry. Of this group of teachers, 83.43 per cent indicated that their animal husbandry courses were of great value to them, while 4.54 per cent indicated that these courses were of little value. About 20 per cent indicated that they needed more work in animal husbandry.[15]

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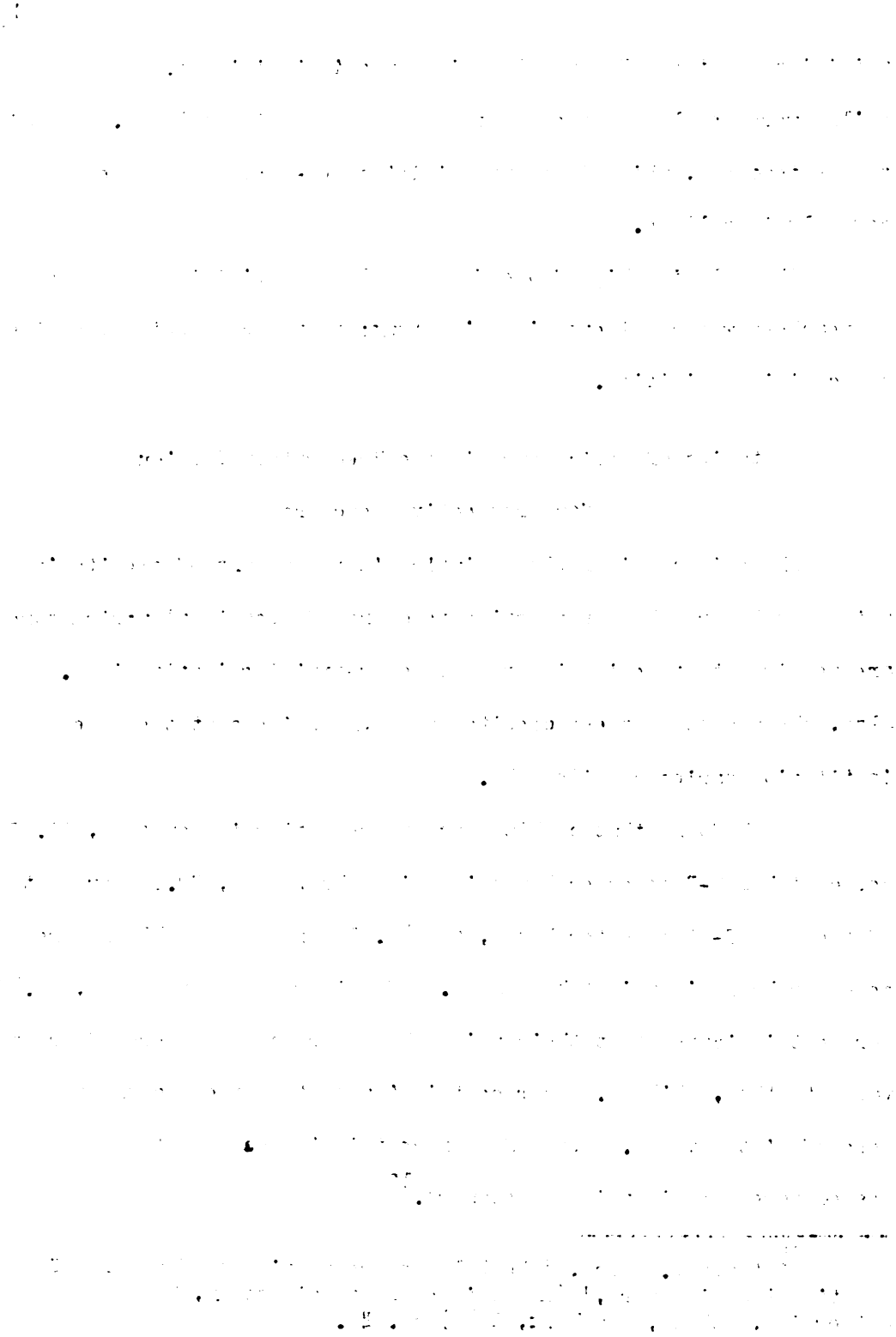
[15] Stuart T. Couch, "The College Preparation of Teachers of Vocational Agriculture," (unpublished Monthesis study, Cornell University, Ithaca, New York, 1949) p. 43.



A minimum of 14 hours in animal husbandry has been recommended by the teacher trainers at Cornell University since 1931; a minimum of 34 hours in technical agriculture has been required of all graduates at Cornell since 1931. The amount of credits recommended in animal husbandry is the most credits recommended in any department; the nearest approach being 13 semester hours in agricultural engineering.[16]

The most frequent needs in animal husbandry, as reported by the teachers, ranked as follows: "more on feeds and feeding", "more work in judging", "a course in meat cutting", "not enough practical material", "need more off-campus courses" and "a need for some course revision."[17]

Emphasis of the need for course revision was made by Couch as follows:

> A considerable amount of revision should be done in several of the technical agriculture courses. The practical application of many of these courses is what a large percentage of the teachers indicated as lacking from a teaching point of view. More of these courses should be organized with more student participation for the development of skills and experiences.[18]

He also points out a need for special sections by saying:

There are some indications that it might be desirable

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[16] Ibid., pp. 71-72.

[17] Ibid., p. 34.

[18] Ibid., p. 61.

> to have special sections in some courses for Majors in Agricultural Education, but this would be justified only when there were at least 25 students or more in these special sections.[19]

As it pertains to needs and values, this is another study in which opinions were involved which might make some of the results controversial; especially this might be true when talking about "great value" or "little value".

A study was made by Hayden in which he reviewed students' transcripts of 360 teachers of vocational agriculture who graduated in 1941 from 30 teacher-training institutions represented in each of the four regions of the United States. He reported that these teachers had an average of 15.3 semester hours in animal husbandry, exclusive of credits in dairy husbandry and poultry husbandry. The range of credits in animal husbandry was from two to 42 semester hours.[20] He reported that of all technical departments in agriculture, the teachers had the largest amount of credits in animal husbandry; the nearest approach was 10 hours each in agricultural engineering and agricultural economics. The teachers in the study had an average of 144 semester hours of college credits.[21]

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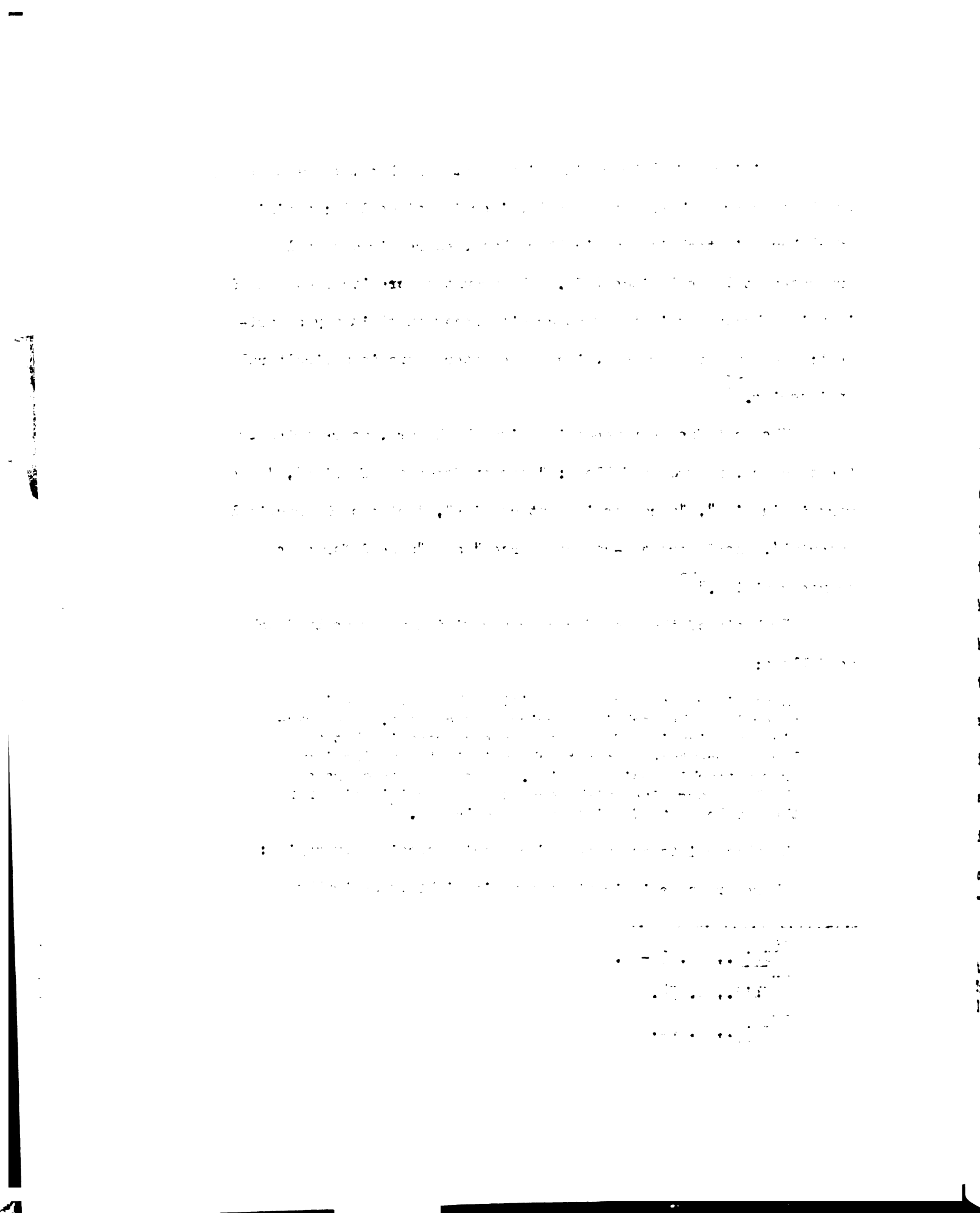
[19] Ibid., p. 61.

[20] Kyle J. Hayden, "Characteristics of College Curriculums for the Education of Teachers of Vocational Agriculture Based on Students' Transcripts," (unpublished Doctor's thesis, Cornell University, Ithaca, New York, 1945) p. 16.

[21] Ibid., p. 101.



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[21] Ibid., p. 101.

This study revealed nothing on importance of courses, contents of courses, or effectiveness of courses in preparing teachers. It merely stated amount of credits.

Gamble found that 204 white teachers of vocational agriculture in Louisiana had a range of 143 to 226 semester hours of college credit, with a median of 159 hours.[22] As reported by the teachers, they had from seven to 49 semester hours in animal husbandry, with a median of 19 semester hours.[23]

As reported in this study, the technical subjects in agriculture constituted a median of 45 per cent of the total credits possessed by teachers, the range in total credit hours being 21.4 to 58.2 per cent. The rank of the five technical areas in agriculture in median per cent of total hours was: animal husbandry, including dairy husbandry and poultry husbandry, agronomy, agricultural economics, agricultural engineering, and horticulture. The median per cent of total hours in animal industry credits was 27.5[24] No attempt was made in this study to determine the needs or deficiencies of teachers in any areas of agriculture.

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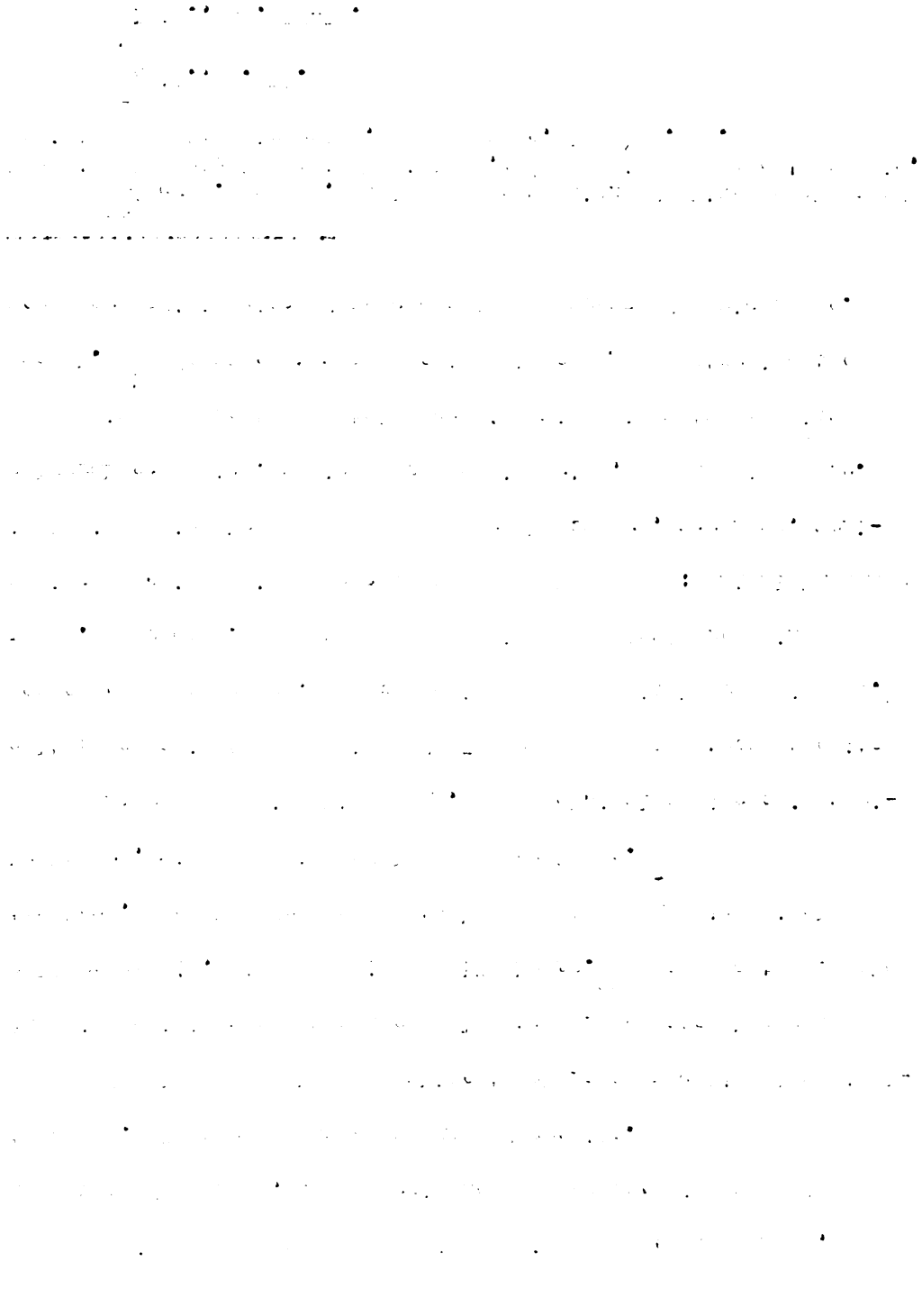
[22] Jack R. Gamble, "College Preparation of White Teachers of Vocational Agriculture in Louisiana," (unpublished Master's thesis, Louisiana State University, Baton Rouge, 1950) p. 52.

[23] Ibid., p. 72.

[24] Ibid., pp. 77-79.



According to Matela, 11 Land-Grant Colleges required an average of 211.3 term hours for graduation of majors in agricultural education in 1947-1948. Eleven other Land-Grant Colleges required an average of 144 semester hours for graduation of their majors in agricultural education. He reported that of the total credits required for graduation in these institutions, an average of 38 per cent was required in technical agriculture; and an average of 30.5 per cent of this technical agriculture was required in animal husbandry.[25] This is approximately 18 semester hours required in the animal husbandry group. (Majors in agricultural education at Michigan State College are required to take a minimum equivalent of 14 semester hours in a similar group of courses.)

As reported in this study by Matela, animal husbandry outranked any subject-matter area in technical agriculture in per cent of total credits required of majors in agricultural education. The average requirements in these areas of agriculture were: animal husbandry, 30.5 per cent; agronomy, 20.7 per cent; agricultural engineering, 18.6 per cent; farm management, 11.2 per cent; horticulture, 9.8 per cent; and other agricultural subjects, 8.9 per cent. An average of 30.9 per cent of the

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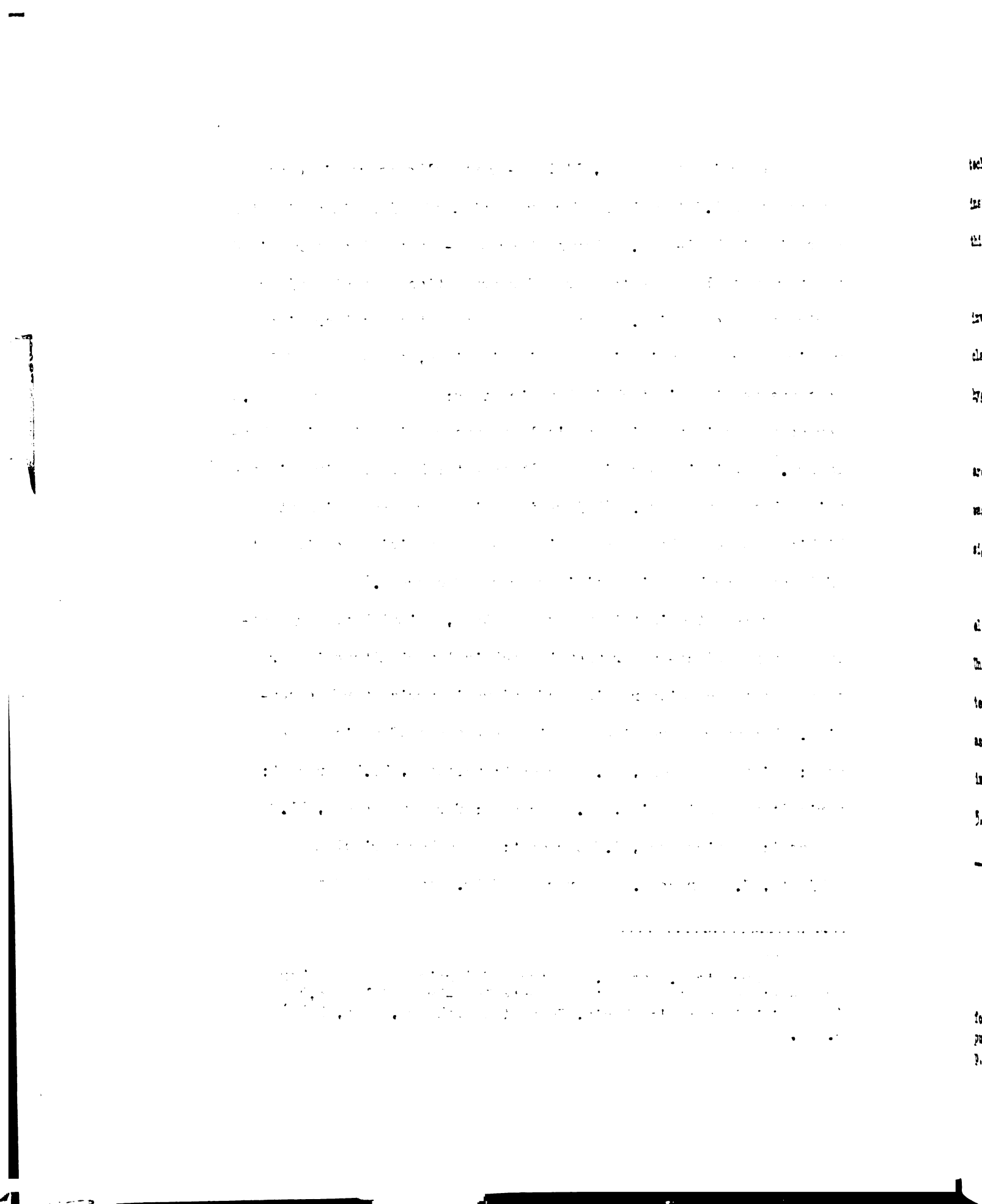
[25] Arcadie G. Matela, "Content of Curricula for Teachers of Vocational Agriculture in Separate Land-Grant Colleges," (unpublished Master's thesis, Iowa State College, Ames, 1948) p. 45.



technical agriculture was required in animal husbandry by the six institutions in the North Central Region according to findings in this study.[26]

Matela states that, "Animal husbandry courses were those involving all phases of animal production and products. This classification included courses dealing with animal diseases and hygiene."[27]

Even though some comparisons were made of the subject-matter areas in terms of credits and percentages, no statistical treatment was presented in the study by Matela that might indicate the significance of these comparisons.

A study of the importance of certain required courses and elective courses for graduation in agricultural education at the University of Idaho was made by Wald. The 76 present and former teachers of vocational agriculture in Idaho evaluated each course as very important, important, of little importance, or of no importance; the weighted ratings of these evaluations were 15, 10, 5, and 0 respectively.[28] Their weighted ratings and rank of the

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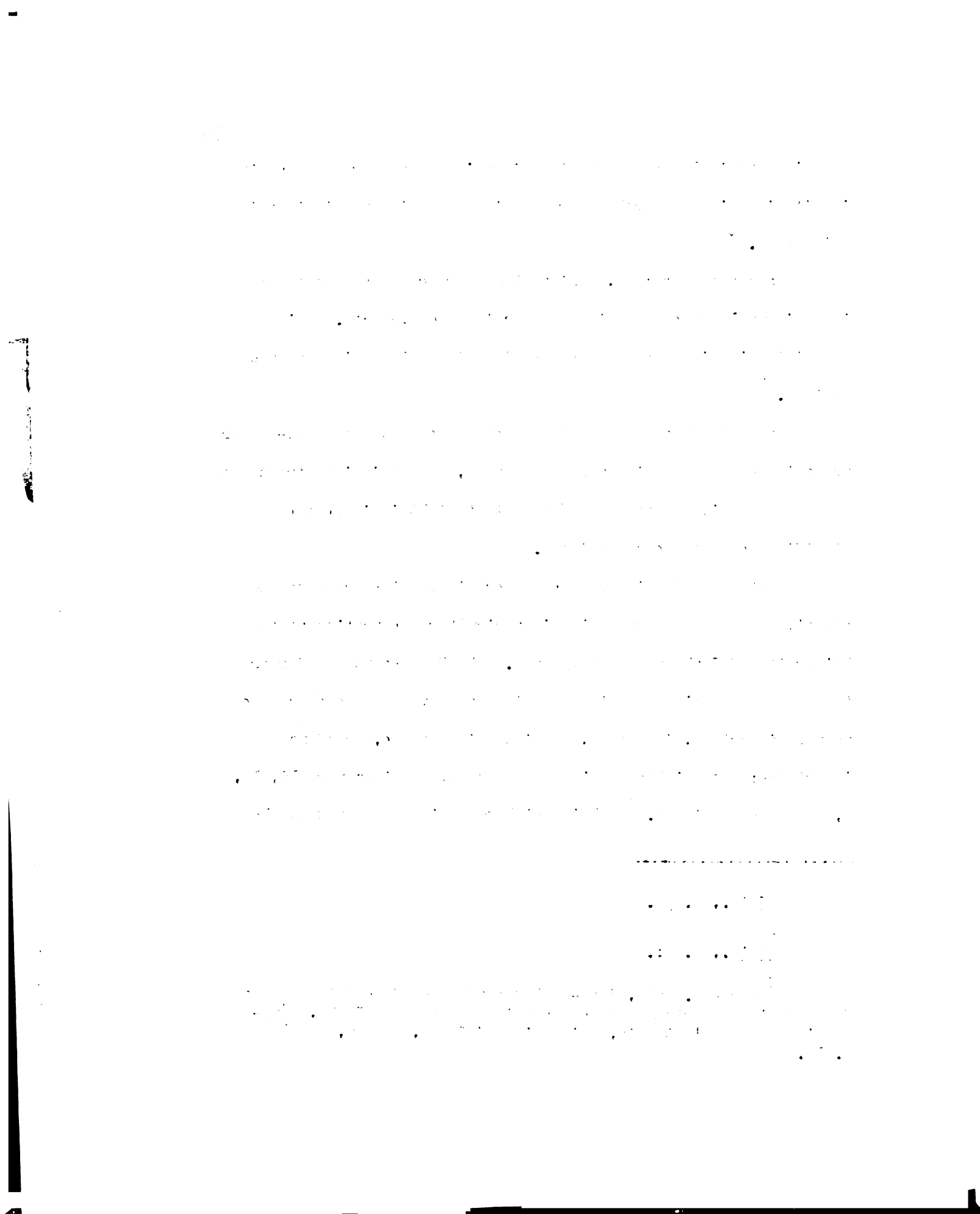
[26] Ibid., p. 58.

[27] Ibid., p. 26.

[28] George J. Wald, "Pre-Employment Value of Certain Courses for Vocational Agriculture Teachers in the State of Idaho," (unpublished Master's thesis, University of Idaho, Moscow, 1949) p. 12.



courses in agriculture of the 37 required courses were: Elements of Dairying, 14 and 5th; General Soils, 13.9 and 9th; Livestock Industry, 13.8 and 10th; Elements of Horticulture, 12.6 and 14th; General Crop Production, 11.4 and 15th; Elements of Plant Pathology, 11.3 and 19th; General Agricultural Chemistry, 11.0 and 20th; and General Agricultural Engineering, 10.7 and 24th. All of these courses were considered as important or very important by the teachers.[29]

Of the 24 recommended elective courses, the weighted ratings and rank of the courses in agriculture as reported by the teachers were: Feeds and Feeding, 14.8 and 1st; Non-Infectious Diseases, 12.7 and 4th; Meats (butchering, curing and cutting) 10.5 and 19th; and Infectious Diseases, 10.1 and 20th. The following were written in as important by the number of teachers indicated for each course: Livestock Judging 11, Dairy Cattle Judging 9, and Sheep Production 5. The elective course, Feeds and Feeding, received the highest weighted rating (14.8) of all the required courses and all the elective courses.[30]

As to the areas of additional work desired by the teachers, Wald says:

> There seems to be a strong tendency on the part of the present and former teachers taking part in this survey to

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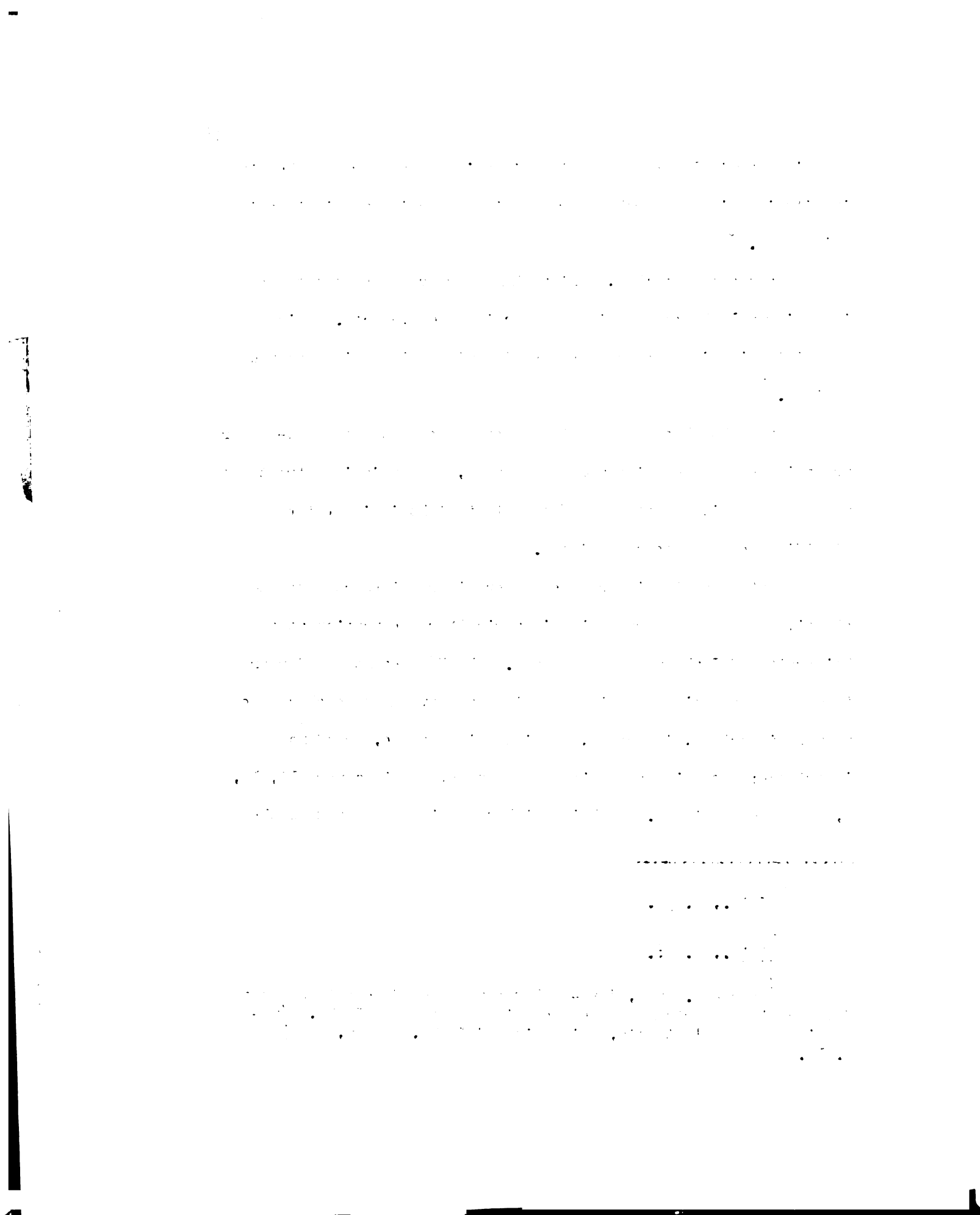
[29] Ibid., pp. 35-36.

[30] Ibid., pp. 37-38.



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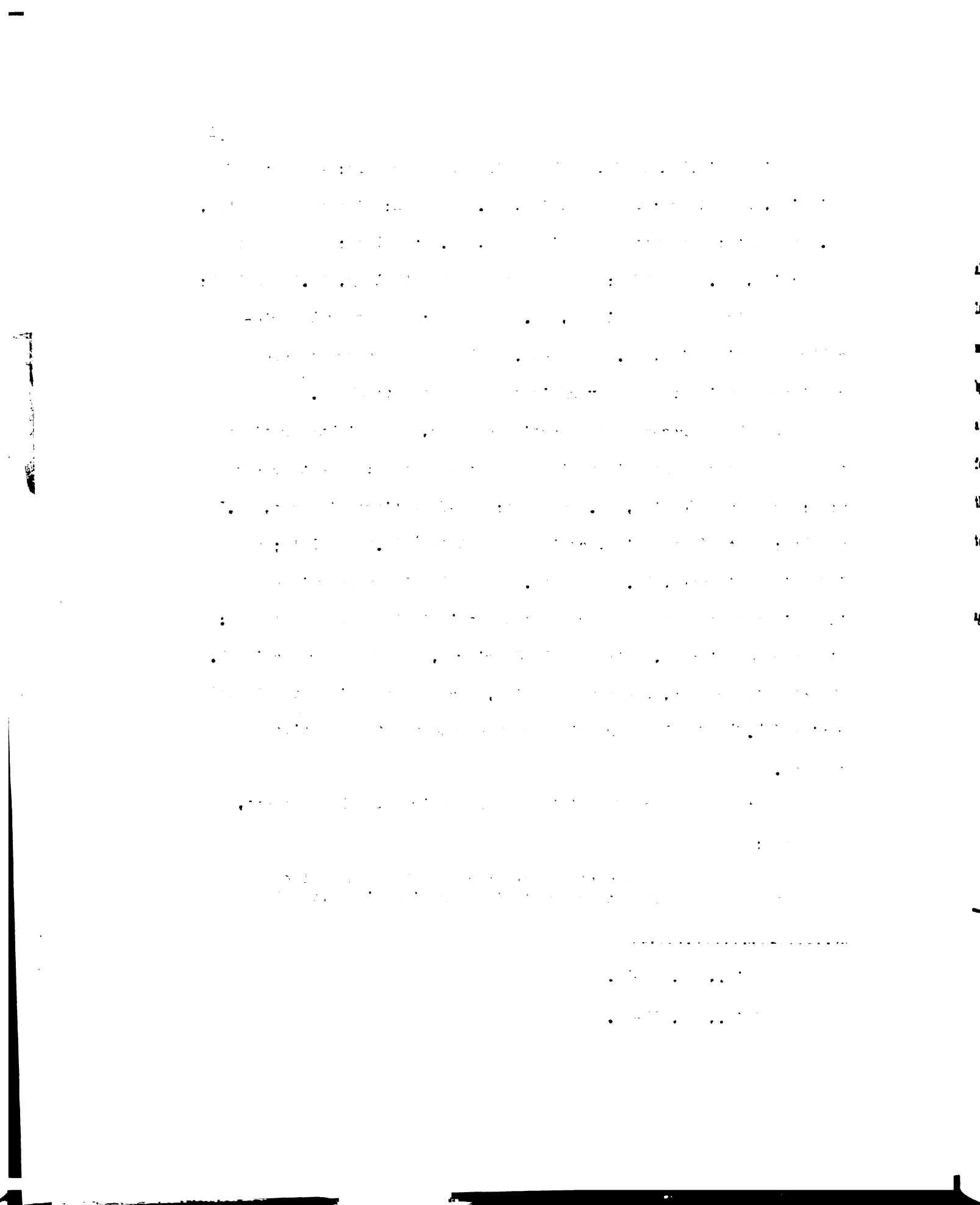

> favor additional work in the following fields of work in: a. Agricultural Economics, b. Animal Husbandry, and c. Agronomy.[31]

He indicates some need of course revision by saying, "There also seems to be a very strong desire for more courses which stress laboratory work in which skills that are to be taught can first be mastered by the prospective teacher."[32] Even though the findings by Wald were based on opinions of degree of importance, they give a fairly good evaluation of required courses and elective courses for majors in agricultural education. This should be helpful to those who construct the curriculum in agricultural education in a teacher-training institution.

Hill summarizes his findings pertaining to curricula in agricultural education in the following statements:

> A study of the curriculum requirements as set forth in the curricula of forty-four agricultural teacher training institutions in forty-one states reveals certain similarity in the grouping of requirements. This similarity appears only in the broad classification, however. . . . This similarity is no longer evident when the broad classifications are broken down to the common course, identification terminology. ... The same situation exists in each phase of this study, and with this in mind the only conclusion for one to draw indicates that each curriculum has not been mapped according to the need of the state, but has either just

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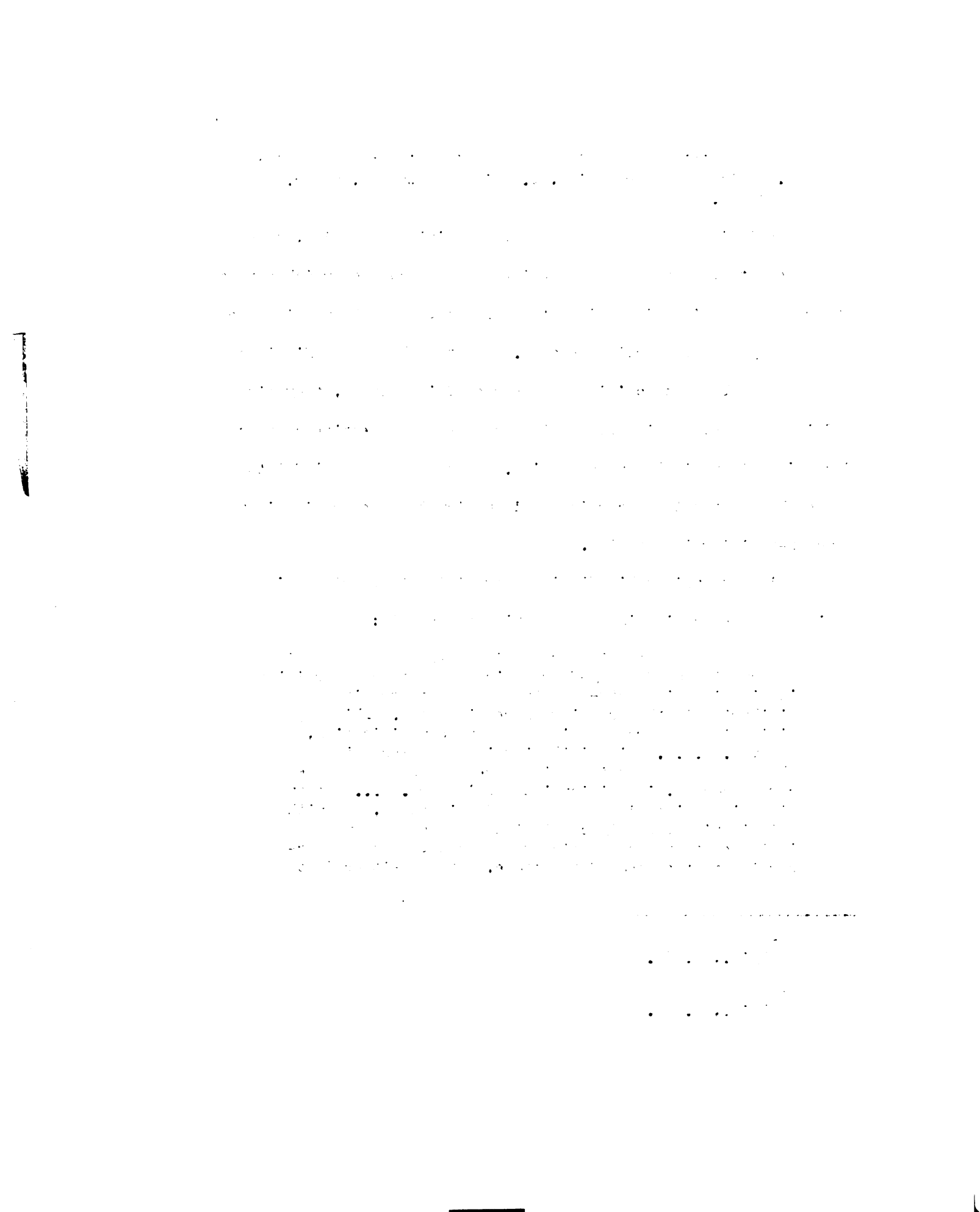
[31] Ibid., p. 38.

[32] Ibid., p. 38.



> happened or has been planned to satisfy the individual likes or dislikes of the curricular authorities of the institutions.[33]
>
> . . . . . .
>
> An analysis of technical agricultural requirements in the teacher training institutions of the Southern region discloses considerably more planning or similarity in requirements than in any of the previously discussed regions . . . . In the Southern region 64.29 per cent of the fourteen reporting teacher-training institutions require the major of agriculture to be taken in the field from which the major portion of the agricultural income is derived as compared to 25 per cent of the eight reporting institutions in the Northeastern region, 33-1/3 per cent in the North Central region, and 60 per cent of the ten reporting institutions in the Western region.[34]

Even though comparisons were made of the course requirements in the institutions in the different regions, no statistical treatment was given to show whether or not the differences were significant. However, the study did show the requirements of each of the reporting institutions in each area of agriculture and the farm income of each area of agriculture of the states in which the institutions were located.

Nyah reported that there was a tendency of teachers of vocational agriculture to allocate their periods of instruction based on training and experience rather than on the basis of

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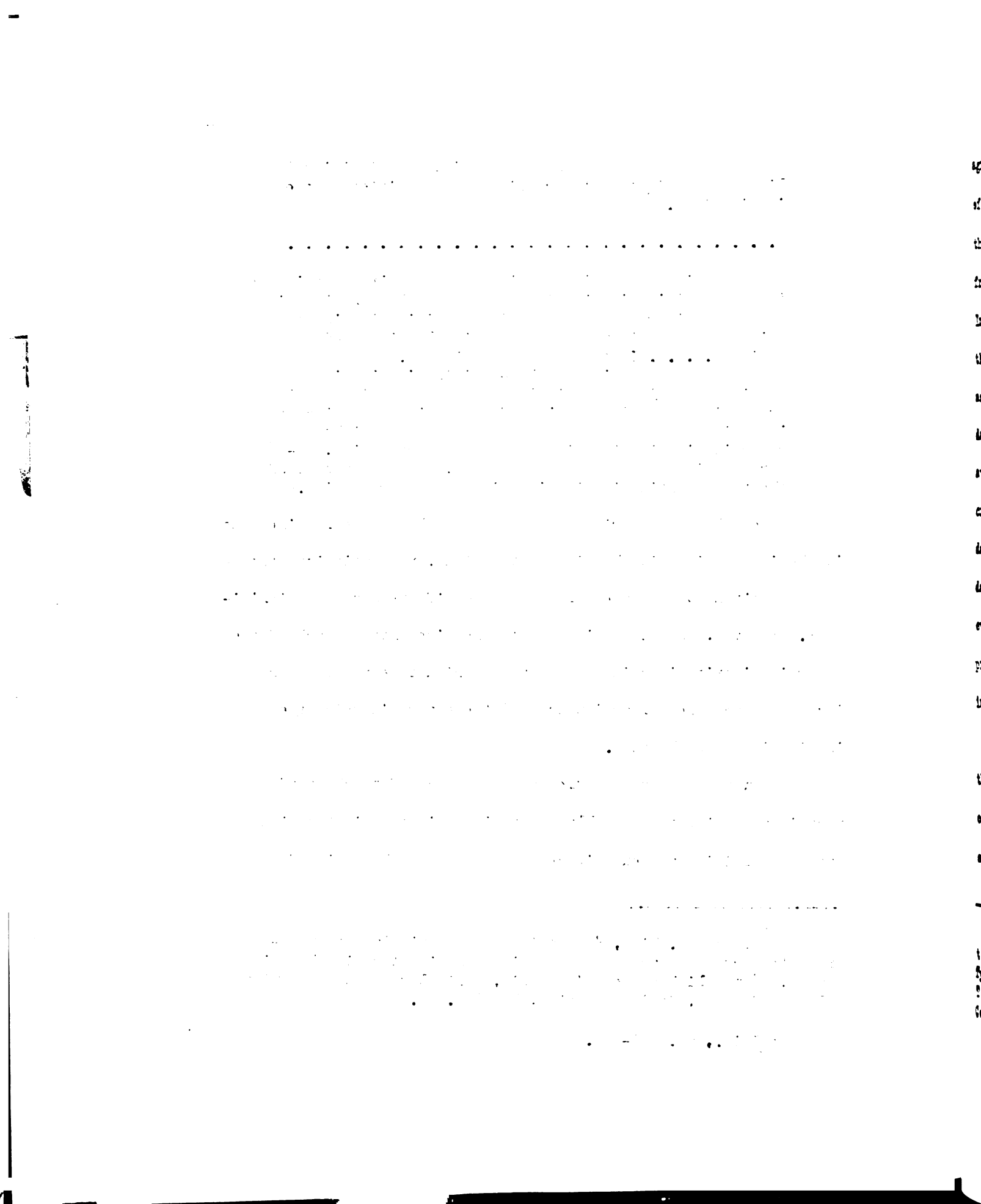
[33] Gregory A. Hill, "Comparisons of Curricula for Under-Graduate Work for Teachers of Vocational Agriculture in the United States," (unpublished Master's thesis, Agricultural and Mechanical College of Texas, College Station, 1946) p. 99.

[34] Ibid., pp. 101-102.



agricultural needs of the communities. He found that in three types-of-farming areas of northwest Texas, a crop enterprise contributed the major part of the farm income in every community, and the income from a crop enterprise was second in two-thirds of the communities. In analyzing the transcripts of 37 teachers in this area, he found the average number of semester hours in technical agriculture to be as follows: agronomy, 11.6; animal husbandry, 20.2; horticulture, 5.5; dairying, 7; and poultry, 4.2. As reported by the teachers, the average number of 90-minute periods devoted to the enterprises were: crop enterprises, 15.3; livestock enterprises, 63.3; horticulture, 17; dairying, 24.8; and poultry, 32.9. Ryan indicated that horticulture, dairying, and poultry were of very little importance in this area even though as many or more periods were devoted to these enterprises as were devoted to crop enterprises which were the most important in the area.[35]

The study by Ryan did not reveal abilities of teachers nor the jobs taught in the enterprises. However, it did reveal a lack of relationship between the importance of enterprises and the enterprises taught in communities. It revealed a lack of relation-

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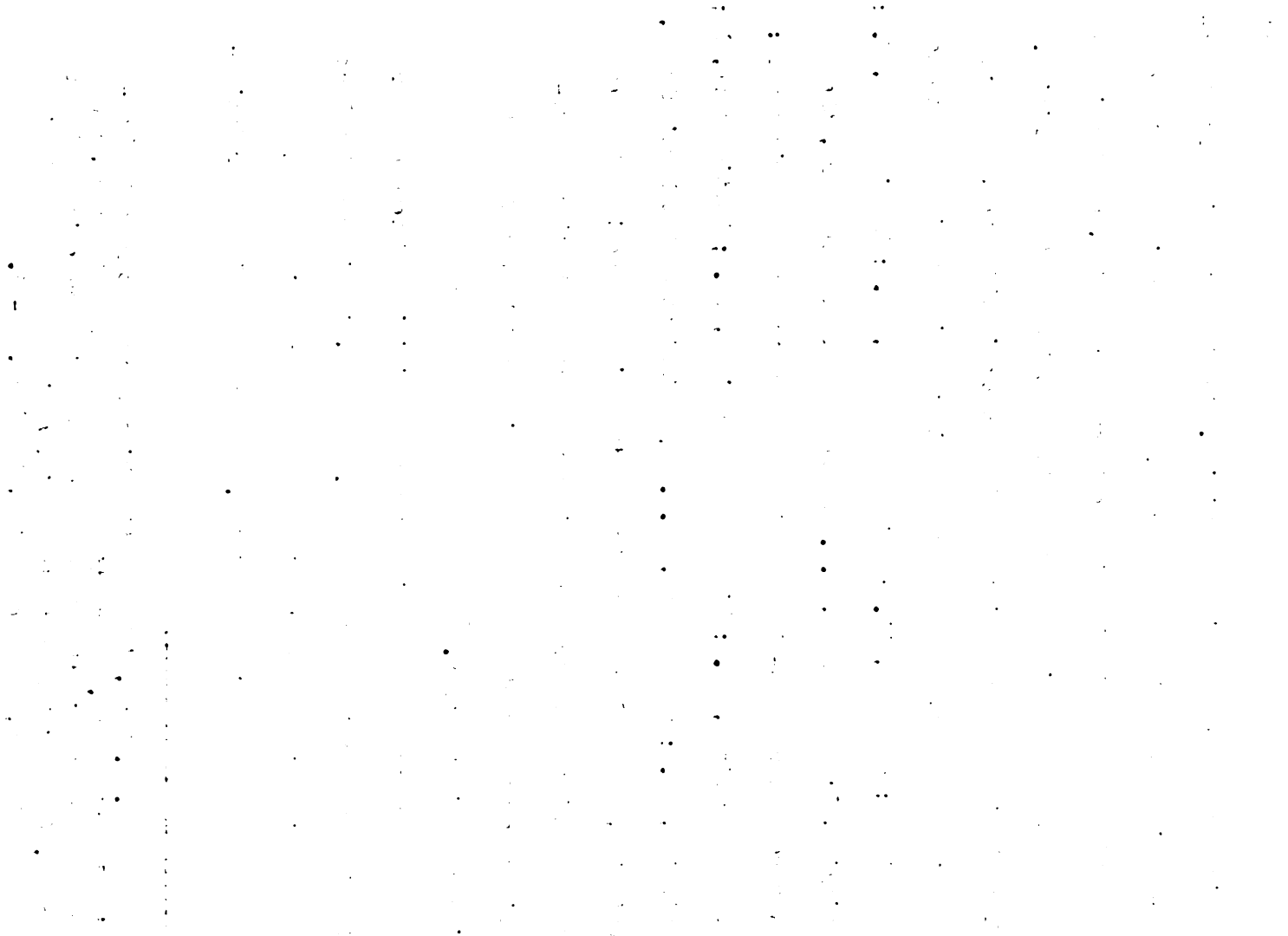
[35] O. T. Ryan, "The Relationships between Courses in Vocational Agriculture, Preparation of Teachers of Agriculture, and Types of Farming in the Three Types-of-Farming Areas in Northwest Texas", (unpublished Master's thesis, Agricultural and Mechanical College of Texas, College Station, 1936) pp. 32-33.

ship between preparation of teachers and importance of enterprises in communities. It showed that teachers were allocating most of their time to enterprises in which the teachers had the most preparation. These findings should be helpful to the curriculum committees at the teacher-training institutions in constructing the curricula for majors in agricultural education. Also, these findings should be helpful to educators in selecting teachers of vocational agriculture for their communities.

Studies of Knowledge of Subject Matter Possessed by Teachers of Other Subjects

Is a knowledge of subject matter of value to teachers of vocational agriculture only; or, is a knowledge of subject matter essential for teachers of other subjects? Recent studies pertaining to subject matter possessed by teachers of subjects other than vocational agriculture are very limited in number. These studies have dealt primarily with the relationship between knowledge of subject matter and ability of teachers.

From the summary of an unpublished doctor's thesis on file at the library of the University of Wisconsin in 1939, Rostker made a report of the teaching abilities of 25 teachers of Social Studies who taught 375 5th grade pupils. The pupils were tested for their intelligence, reading ability, and socio-economic status.



ship between preparation of teachers and importance of enterprises in communities. It showed that teachers were allocating most of their time to enterprises in which the teachers had the most preparation. These findings should be helpful to the curriculum committees at the teacher-training institutions in constructing the curricula for majors in agricultural education. Also, these findings should be helpful to educators in selecting teachers of vocational agriculture for their communities.

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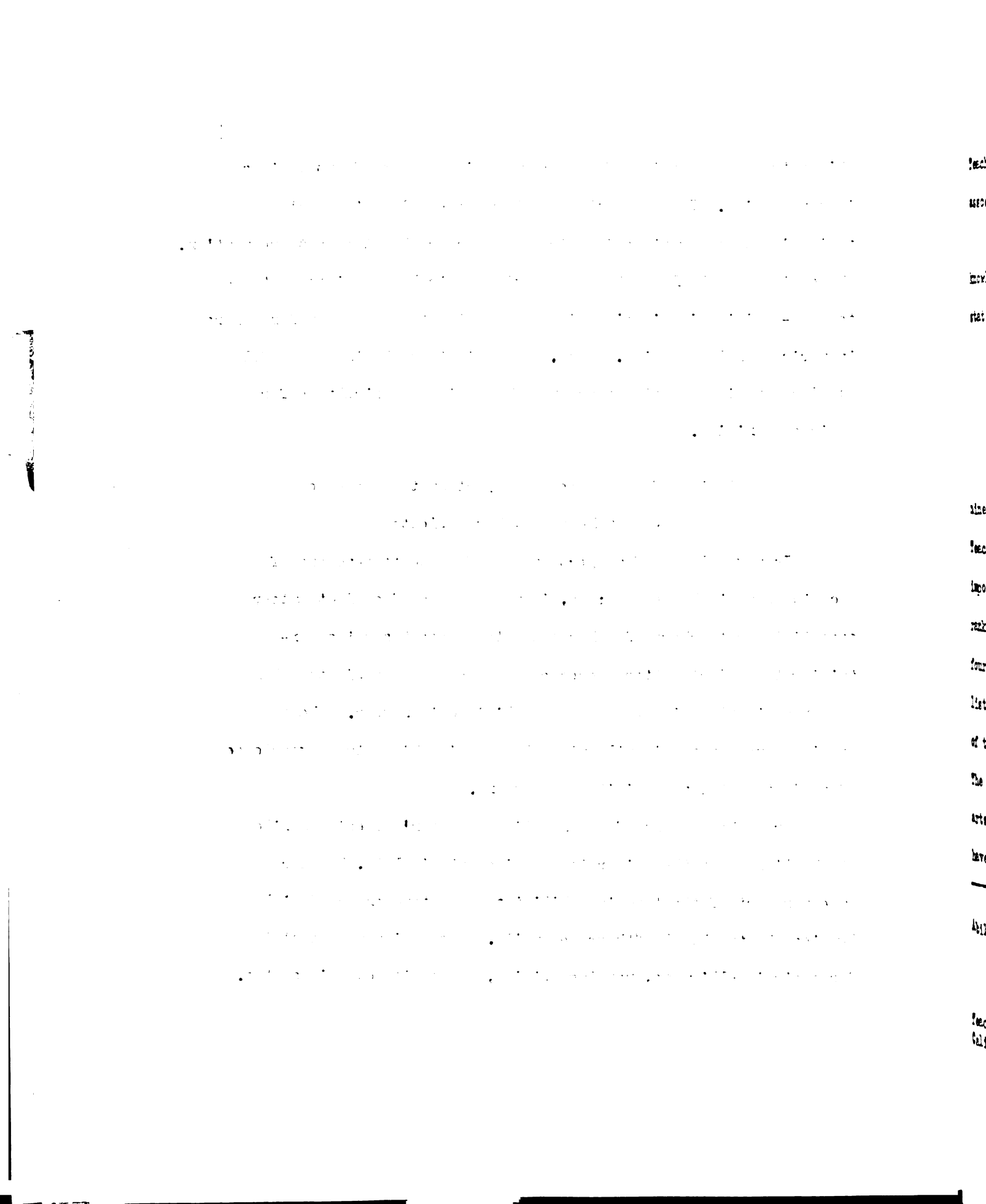

Teachers were measured for those traits and characteristics commonly associated with teaching ability.[36]

The results of this investigation, as they relate to a knowledge of subject matter, are summarized by Rostker in this statement:

> Knowledge of subject matter bears no great relationship to teaching ability but if results obtained from tests were used to measure non-important objectives were included, there appears to be a significant association with teaching ability.[37]

Characteristics of industrial arts teachers were grouped into nine competency classifications in a study reported by Seefeld. Teachers were asked to rank these nine classifications as to relative importance; also the characteristics in each classification were ranked as to importance. The technical classification was ranked fourth by 375 teachers of industrial arts. Of the 11 characteristics listed in the technical classification, a knowledge of "Know How" of the subject was rated as the most important by the teachers.[38] The importance of a knowledge of subject matter for an industrial arts teacher is indicated by Seefeld in the statement, "... He must have a complete knowledge of his subject."[39]

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[36] Leon E. Rostker, "The Measurement and Prediction of Teaching Ability," School and Society, Vol. 51, No. 1306, Jan. 6, 1940, pp. 30-31.

[37] Loc. cit.

[38] Kermit A. Seefeld, "The Competences of Industrial Arts Teachers," (unpublished Doctor's dissertation, Stanford University, California, 1949)

[39] Ibid., p. 231.

The Rostker report and the Seefeld study indicate that a knowledge of subject matter is very important for teachers of subjects other than vocational agriculture. The findings of Littler,[40] Madsen,[41] Shannon,[42] Barr,[43] and Hart,[44] to which references were made in chapter one, are very similar to those of Rostker and Seefeld.

Even though the results of these studies indicated that a knowledge of subject matter was important for teachers, this impertance was determined primarily by opinions of students, teachers, or educators who evaluated the teachers. These investigations did not reveal factors associated with abilities in subject taught, nor factors associated with jobs taught, nor correlation between abilities possessed in the subject and jobs taught, as will be done in the present study.

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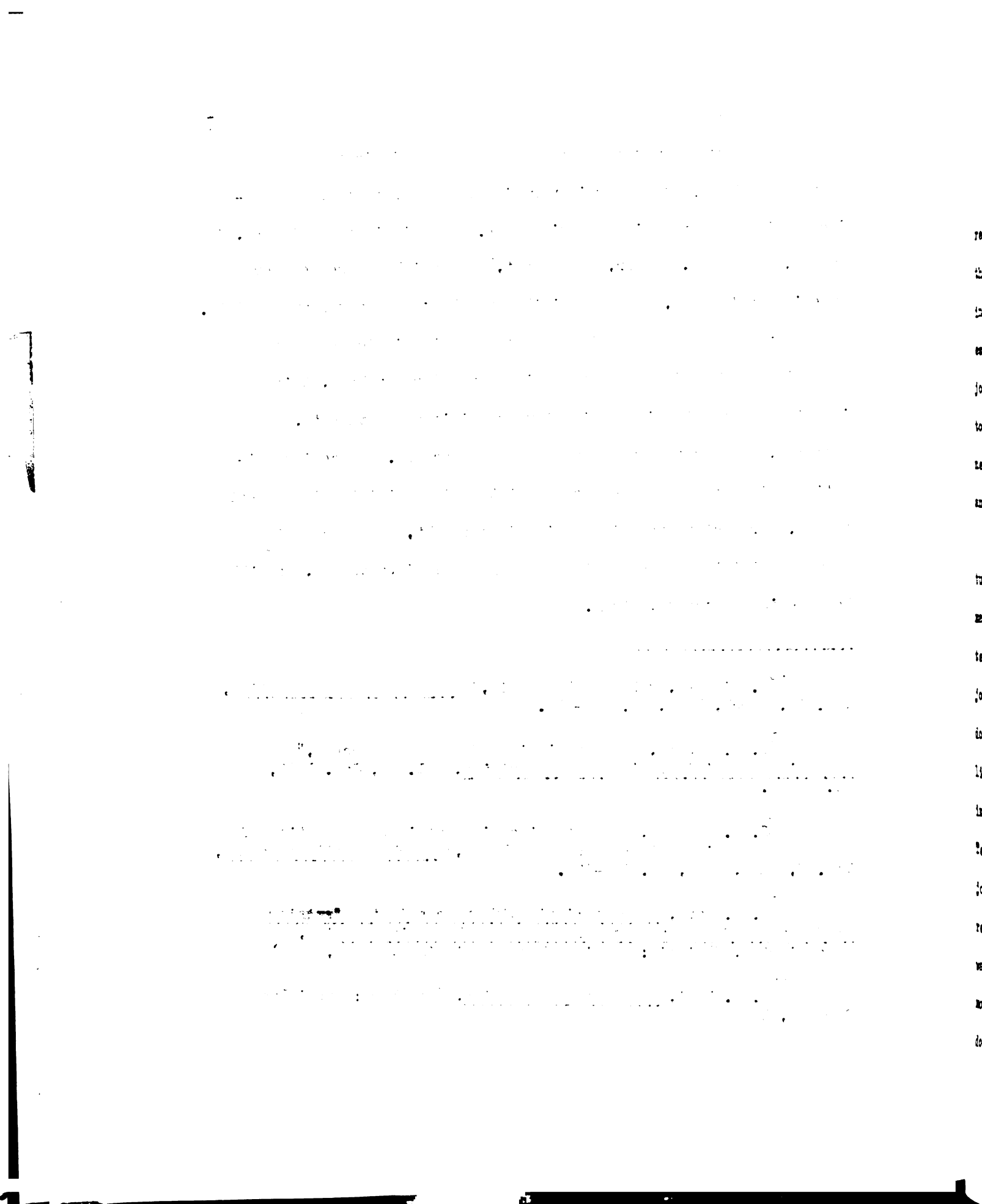
[40] S. Littler, "Why Teachers Fail," Home and School Education, Vol. 33, March, 1914, pp. 255-256.

[41] I. N. Madsen, "The Prediction of Teaching Success," Educational Administration and Supervision, Vol. 13, Jan. 1927, pp. 39-47.

[42] J. R. Shannon, "Competencies Aimed at in the Education of Teachers at Indiana State Teachers College," Teachers College Record, Vol. 8, July, 1942, pp. 125-126.

[43] A. S. Barr, Characteristic Differences in the Teaching Performance of Good and Poor Teachers of the Social Studies, (Bloomington, Illinois: Public School Publishing Company, 1929)

[44] F. W. Hart, Teachers and Teaching, (New York: Macmillan Company, 1934)



Summary

A brief summary will be presented of the four groups of related studies that have been reviewed. The investigators reported that present and prospective teachers of vocational agriculture indicated that an adequate knowledge of subject matter was very essential for teaching agriculture. They also reported that most jobs commonly listed in the livestock enterprises should be taught to classes in vocational agriculture. The teachers indicated a need for additional courses in animal husbandry; especially in Feeds and Feeding, Meats and Livestock Judging.

The studies revealed that teachers of vocational agriculture believe it to be very necessary for them to be able to do manipulative jobs in the livestock enterprises. However, these teachers indicated that they can do less than one half of these jobs. The teachers expressed a need for more training in how to do these jobs. According to teachers, manipulative jobs in livestock enterprises rank high in importance when compared with the importance of manipulative jobs in other areas of agriculture. Teachers indicated that they were better qualified to do manipulative jobs in other areas of agriculture than in animal husbandry. The reported rank of qualifications of teachers in these enterprises was: swine, beef cattle, and sheep. The studies indicated that most abilities in animal husbandry were acquired with experience of doing the jobs; also, manual abilities were acquired before entering

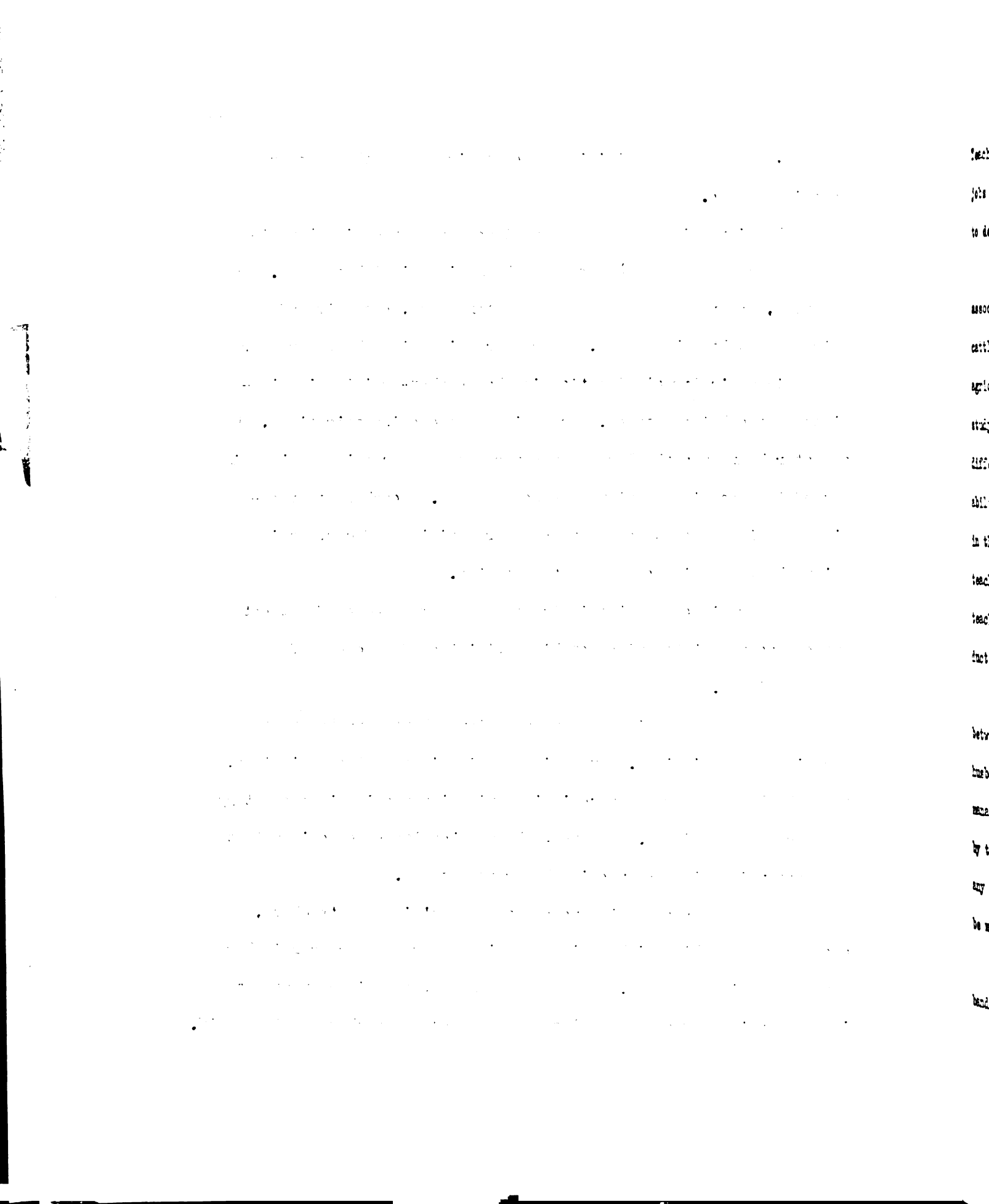
college, and judgment abilities were acquired when the teachers were in college.

The investigators found that teachers of vocational agriculture had from two to 49 semester hours in animal husbandry. As reported, an average of about 15 semester hours, exclusive of dairy and poultry husbandry, was required in animal husbandry for majors in agricultural education in the teacher-training institutions of the United States. According to these investigations, 15 semester hours was the largest average amount of credit required in any of the technical agriculture departments. Teachers of vocational agriculture expressed a need for revisions of courses in animal husbandry in several of the studies.

The reviewed studies indicated that a knowledge of subject matter was associated with teaching abilities of teachers of other subjects.

All of the studies that were reviewed have revealed some very important findings. By making applications of these findings, they should be of great value in improving instruction in elementary and secondary subjects. However, the studies lacked some important analyses which will be made in the present study.

Most of these studies were based on opinions of teachers, except those dealing with agriculture in the preparatory curriculum for prospective teachers. The element of degree of importance was involved which makes the results of responses of teachers controversial.



Teachers were not asked if they had done certain jobs nor if these jobs had been taught. All of the studies lacked statistical analysis to determine the significance of the results obtained.

In the studies reviewed, none was found dealing with the association of certain factors and abilities possessed in the beef-cattle, sheep, and swine enterprises by teachers of vocational agriculture or the jobs taught by these teachers. The present study will make statistical comparisons between teachers with different amounts of credits in animal industry, as to their abilities in three livestock enterprises and the jobs they taught in these three enterprises. Similar comparisons will be made between teachers with different number of years of teaching, and between teachers located in areas of varying importance of livestock production.

None of the reviewed studies made statistical comparisons between manipulative abilities and managerial abilities in animal husbandry possessed by teachers nor between manipulative jobs and managerial jobs taught. Comparisons between abilities possessed by teachers in the different livestock enterprises were not made in any of the studies reviewed. These statistical comparisons will be made in the study by the writer.

Studies of correlations between abilities in animal husbandry that teachers possess and the jobs taught in animal hus-

bandry were not included in any of the investigations reviewed but will be included in the present study.

Chapter two has presented findings of related studies, and the similarities and differences between these studies and the present study have been mentioned. Chapter three will present methods of investigation used in conducting the present study.

CHAPTER III

METHODS OF INVESTIGATION

Selection of the Area to be Studied

The technical education of a farmer or a prospective farmer includes a wide field of areas in technical agriculture. The teacher of vocational agriculture needs technical education in several areas of agriculture if he is to be successful in teaching farmers and prospective farmers. Because of the amount of time and effort that would be required by the teachers included in the survey, if all areas in technical agriculture were included, it was decided to limit the study to the area of animal husbandry.

After the area of animal husbandry was tentatively selected, a conference was held with Professor George A. Brown who was formerly head of the Department of Animal Husbandry at Michigan State College. The importance and purposes of the study, methods of investigation, and some of the possible outcomes of the study were discussed. Also at this conference, it was decided to include the beef-cattle, sheep, and swine enterprises; it was thought that the horse and mule enterprise was of too little importance in Michigan to be included. The dairy enterprise was not included because instruction in this enterprise at Michigan State College is offered in the dairy department instead of the animal-husbandry

department as it is in some institutions. Also, the inclusion of this enterprise would have resulted in a check-list of such length that some teachers might not have given sufficient time to checking any items.

Determination of Abilities and Jobs to be Included

Teachers of vocational agriculture possess both manipulative and managerial abilities, and they teach manipulative and managerial jobs. For this reason it was decided to include both of these types of abilities and jobs in the study.

The next step was to decide which of these abilities and jobs to include, since it would be impossible to make an all-inclusive list of either. A tentative list of approved practices was made for each of the beef-cattle, sheep and swine enterprises. These lists of approved practices were submitted to members of the staff in agricultural education and to the various subject-matter specialists in the Department of Animal Husbandry at Michigan State College. After their criticisms and suggestions had been made, a final list of approved practices was made for each of these enterprises.

These lists of approved practices served as a basis for determining tentatively the manipulative abilities, the managerial abilities, the manipulative jobs, and the managerial jobs to be included in the check-list for the study. After a tentative list of abilities and jobs had been formulated for each enterprise, it was

resubmitted to ten members of the staffs in agricultural education and animal husbandry. After their criticisms and suggestions had been made, a final draft of the abilities and jobs was made for each enterprise.

Construction of the Check-list

A check-list was developed. It included a page for the manipulative abilities and manipulative jobs for each enterprise and a page for the managerial abilities and managerial jobs for each enterprise. An item on the check-list was considered as an ability and a job. It was considered as an ability when the teacher checked the item as to whether he had performed and could demonstrate the manipulative job or as to whether he could teach the managerial job. The item was considered as a job when the teacher checked the item as to whom taught.

On the pages listing manipulative items, space was provided for the teacher to check (x) <u>one</u> of three possibilities for "Performance" - "Have performed, feel qualified to demonstrate", "Have performed, do not feel qualified to demonstrate", and "Have not performed" - for each item. Also, on these pages, space was provided for the teacher to check (x) <u>one</u> or <u>more</u> possibilities for each item as "To whom taught" - "All-day classes", "Young-farmer classes," "Adult-farmer classes" and "Not taught".

On the pages listing managerial items, space was provided for the teacher to check (x) one possibility for each of the items as to "Teaching Ability" - "Feel qualified to teach" or "Do not feel qualified to teach". On these pages space was provided for the teacher to check each item as "To whom taught."

Space was provided on the first page for the teacher to write his name, the name of his school, the name of the county in which he was teaching, the number of years as a teacher of vocational agriculture, and an answer to the question, "Do you have 12 or more credits in animal husbandry?"

Try-out of the Check-list

A "try-out" of the check-list was made with eight teachers of vocational agriculture in Michigan. Two teachers were selected in important areas of beef cattle production, two in important areas of sheep production, two in important areas of swine production, and two teachers in areas of general farming of the state. As a result of this try-out, a few items were re-worded and a few items were added to the check-list. The revised check-list was then duplicated.

The data on the check-lists returned by the above eight teachers were used to determine the reliability of the check-list. One method for determining reliability is by scoring two half-tests

which is suggested by Thorndike.[1] The test or check-list is divided into two halves, commonly by letting the odd-numbered items constitute one half and the even-numbered items other half, scoring of each half separately, and correlating the scores on the two half-sets. The resulting correlation is then corrected by the Spearman-Brown formula to take account of the double length of the whole test. A correlation of .904 was obtained by using this method on the data found on the eight check-lists returned by the eight teachers used in the trial.

Administration of the Check-list

A copy of the check-list was sent to each of the 50 fully-qualified teachers who had graduated from Michigan State College between 1937 and 1946 and who were teaching vocational agriculture in Michigan during the academic year of 1949-50. A cover letter was sent explaining the purpose of the study and directions for checking the items.

A follow-up letter was sent to 12 teachers, and a second follow-up letter with another copy of the check-list was sent to six of the 12 teachers who had not responded.

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[1] Robert L. Thorndike, "Reliability", Encyclopedia of Educational Research, Revised Edition, 1950, pages 1016-1017.

Final returns included responses from 48 teachers of which 45 or 90 per cent were usable. The returns from three teachers were discarded because none of the managerial items in any of the enterprises were checked, and there was inconsistency in the checking of the ability to teach or perform a job and in the checking items as to whom taught. In some instances, an item was checked as "Have performed, can demonstrate" and also checked as "Have not performed". Also in some instances, the item was checked as having been taught to one or more classes and also as not taught.

Summarization of Data

From the check-list of each teacher, a count was made of the manipulative jobs and managerial jobs in each enterprise that he could do; a similar count was made of these jobs that he taught to all-day classes and to out-of-school classes.

An item count was made of the teachers who could do each job in each enterprise; a similar count was made of the teachers who taught each job to all-day classes and to out-of-school classes.

The teachers were grouped according to the per cent of manipulative jobs in each enterprise that they could do and according to the per cent of these jobs in each enterprise that were taught to all-day classes and out-of-school classes. Similar groupings were made of the teachers in the managerial jobs in each enterprise. These groupings were based on:

(1) The number of credits in animal husbandry possessed by teachers.

(2) The number of years of teaching experience of the teachers.

(3) The importance of livestock production in the counties where the teachers were located.

The distributions of teachers based on these three factors are found in Tables I, II, and III.

Groupings were made of teachers according to the per cent of manipulative jobs and managerial jobs in each enterprise that they could do, and according to the per cent of these jobs in each enterprise taught to all-day classes and out-of-school classes.

A rank order was made of the manipulative jobs in each enterprise according to the greatest number of teachers who could do the jobs; a similar rank order was made for the managerial jobs in each enterprise.

The teachers were grouped according to the per cent of manipulative jobs in each enterprise that they could do and according to the per cent of these jobs taught in each enterprise to all-day and out-of-school classes. Similar groupings were made of teachers in managerial jobs in each livestock enterprise.

A minimum of 12 credits in one technical department of the School of Agriculture at Michigan State College is considered a field of major interest in the curriculum in agricultural education.

TABLE I

CREDITS IN ANIMAL HUSBANDRY POSSESSED BY TEACHERS INCLUDED IN THE STUDY[2]

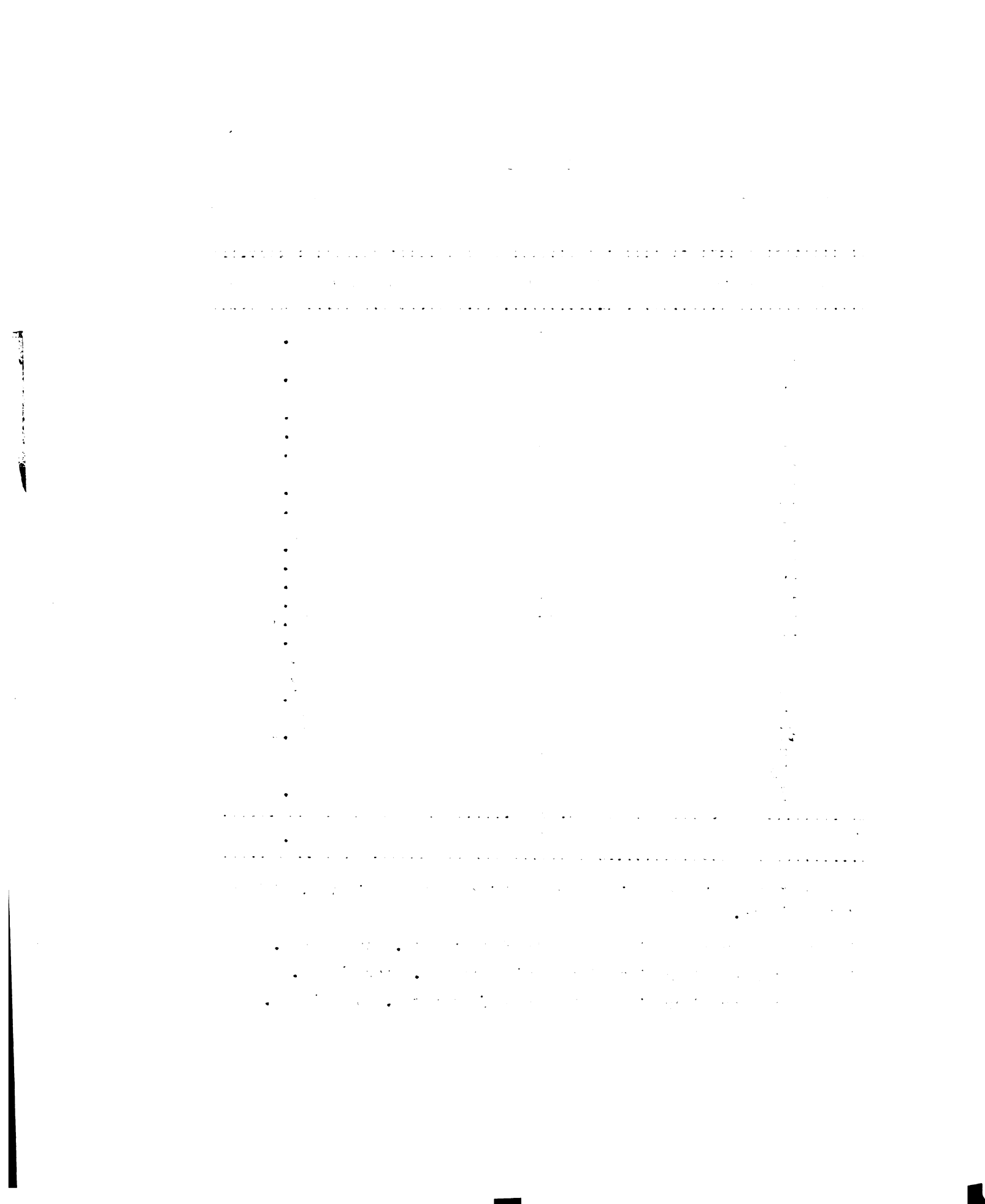
Number of credits	Number of teachers	Per cent of teachers
27	1	2.2
26	0	0
25	1	2.2
24	0	0
23	2	4.5
22	1	2.2
21	1	2.2
20	0	0
19	1	2.2
18	3	6.7
17	0	0
16	2	4.5
15	1	2.2
14	2	4.5
13	2	4.5
12	13	28.9
11	1	2.2
10	0	0
9	0	0
8	5	11.
7	0	0
6	8	17.8
5	0	0
4	0	0
3	1	2.2
Total	45	100.0

[2]Information supplied by the Office of the Registrar, Michigan State College.

The mean number of credits of all teachers was 12.7 term hours.

The mean number of credits of the majors was 15.6 term hours.

The mean number of credits of the non-majors was 6.8 term hours.



The teachers with 12 or more credits in animal husbandry are designated as "majors" and those with less than 12 are designated as "non-majors". There were 30 majors and 15 non-majors in the entire group of teachers included in the study. In Table I it can be seen that the largest per cent (28.9) of the majors had a minimum amount of credits (12) required for a major, and the largest per cent (17.8) of the non-majors had a minimum amount of credits (6) required in animal husbandry in the curriculum in agricultural education.

TABLE II

YEARS OF EXPERIENCE OF TEACHERS INCLUDED IN THE SURVEY

Number of years of experience	Number of teachers	Per cent of teachers
13	5	11.0
12	3	6.7
11	3	6.7
10	12	26.7
9	5	11.0
8	5	11.0
7	2	4.5
6	2	4.5
5	2	4.5
4	6	13.4
Total	45	100.0

The mean number of years of experience of all teachers was 8.8 years.

The mean number of years of experience of the more-experienced teachers was 9.9 years.

The mean number of years of experience of the less-experienced teachers was 6.6 years.

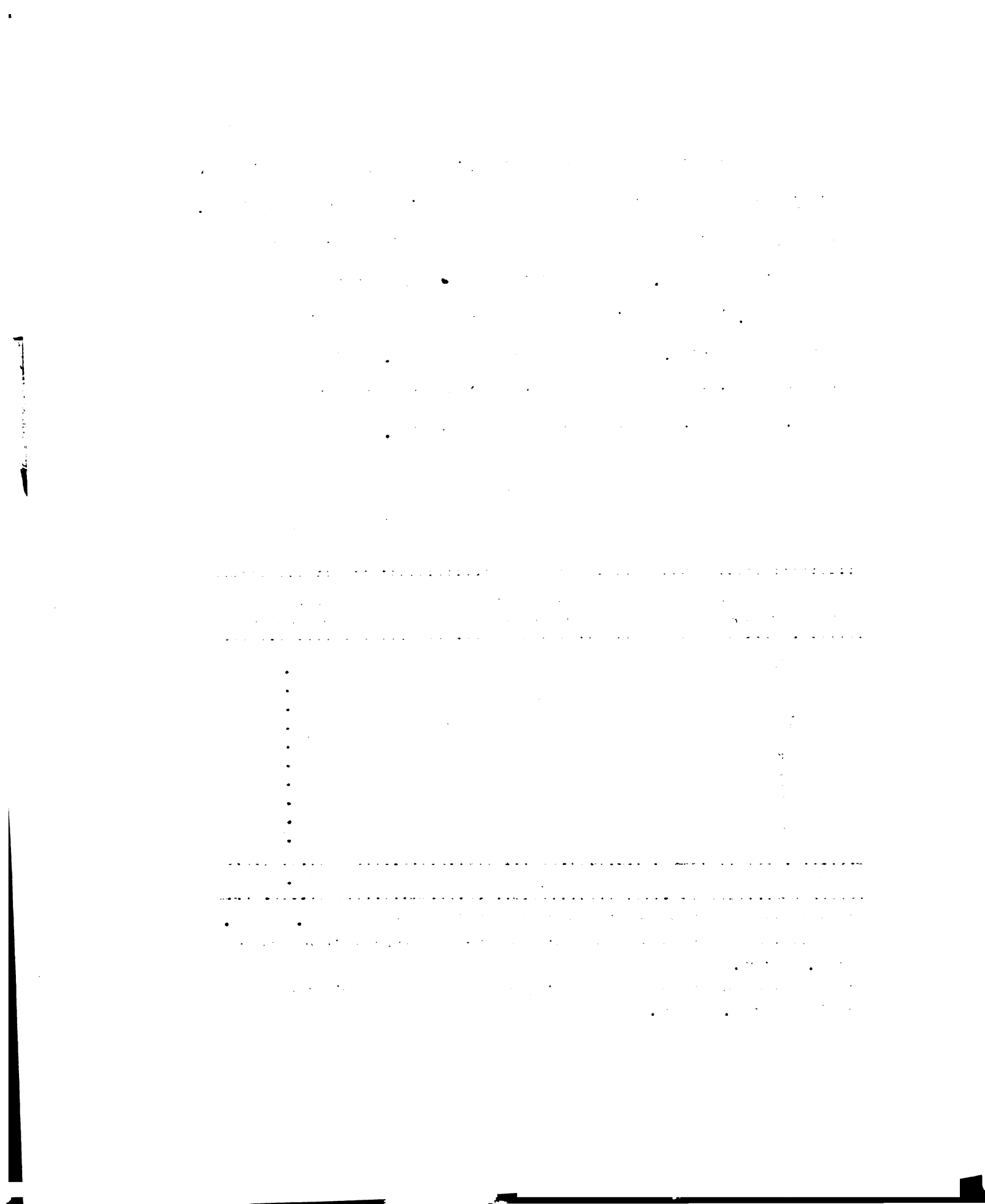
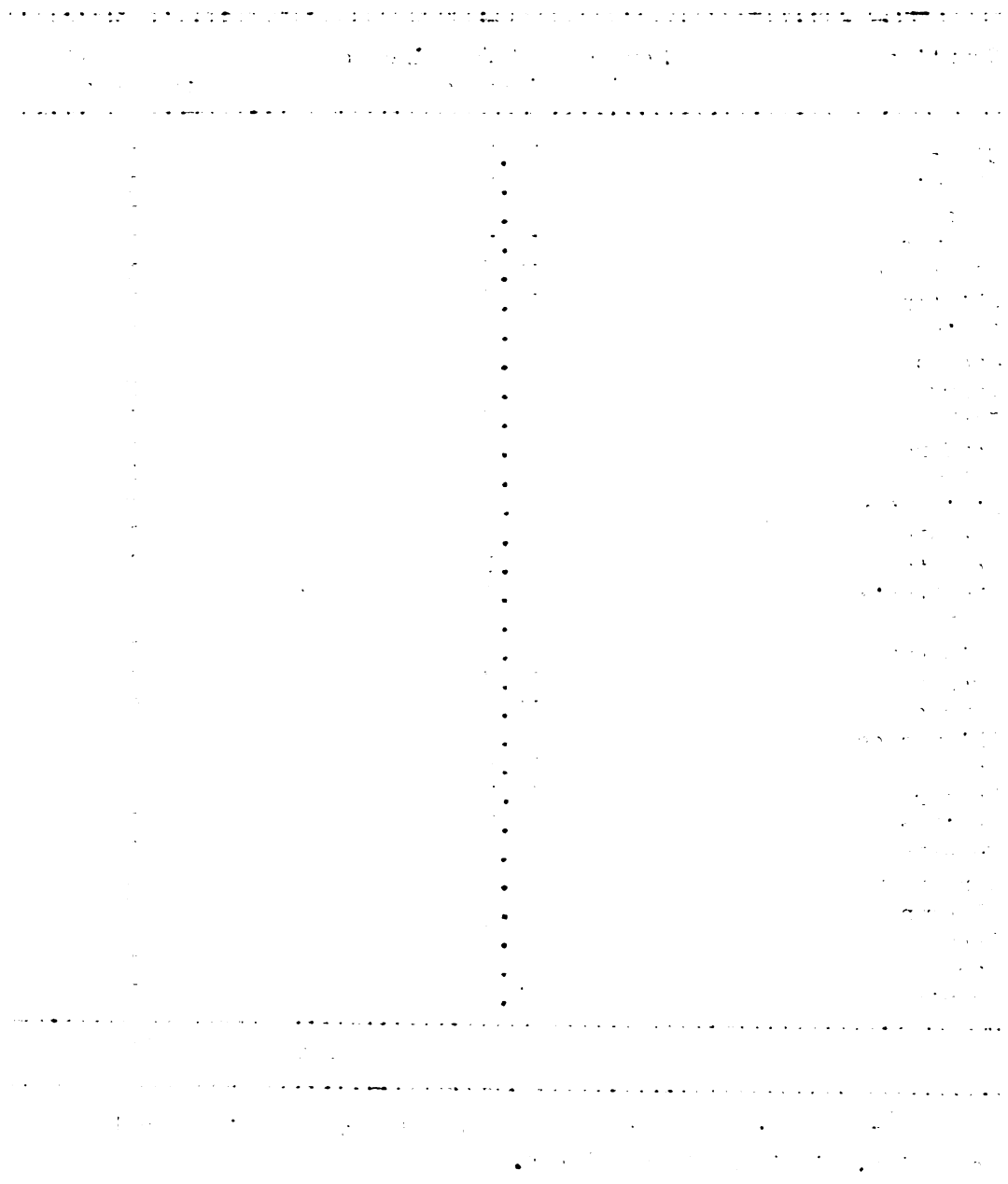


TABLE III

PER CENT OF TOTAL FARM INCOME FROM LIVESTOCK ENTERPRISES IN COUNTIES WHERE TEACHERS INCLUDED IN THE SURVEY WERE LOCATED [3]

Counties	Per Cent of farm income from livestock	Number of teachers
Clare	40.4	1
Gladwin	35.7	1
Osceola	35.5	1
Lenawee	32.7	1
Hillsdale	31.6	1
Clinton	30.6	1
Ionia	30.5	2
Jackson	30.4	2
Barry	29.2	2
Ingham	27.5	3
Wexford	26.9	2
Eaton	25.8	4
Livingston	25.6	2
Osceola	25.0	1
Mecosta	21.1	1
Charlevoix	20.9	1
Oakland	20.5	2
Chippewa	20.0	1
Arenac	18.8	1
Monroe	17.5	1
Shiawassee	17.1	2
Mason	16.8	1
Lapeer	15.7	2
Sanilac	14.7	1
Tuscola	14.0	1
Van Buren	13.4	1
Allegan	13.2	3
Oceana	11.6	1
Macomb	10.1	1
Berrien	7.0	1
	Total	45

[3] Information supplied by the Department of Agricultural Economics, Michigan State College.



Since the mean number of years of experience of all teachers was between eight and nine years, nine was used as the division point for grouping the teachers on the basis of years of experience. Teachers who had taught nine or more years are designated as "more-experienced teachers"; and teachers who had taught less than nine years are designated as "less-experienced teachers". There were 28 more-experienced teachers and 17 less-experienced teachers.

Table II shows that the largest number (12) of more-experienced teachers had taught 10 years which is only 1.2 years more than the mean number of years of teaching of all teachers included in the study. This table also shows that the largest number (6) of less-experienced teachers had taught 4 years which is the minimum number of years of teaching for any of the teachers in the study.

Of the total farm income for Michigan in 1945, 19.89 per cent was from beef-cattle, sheep, and swine. The counties with 19.89 pr cent or more of the farm income from these enterprises are designated as "more-important" areas of livestock production, and the counties with less than 19.89 per cent of the farm income from these enterprises are designated as "less-important" areas. There were 29 teachers in important areas and 16 teachers in less-important areas of livestock production.

Most of the state was fairly represented, geographically, by the location of teachers included in the study, as shown in Figure 1.

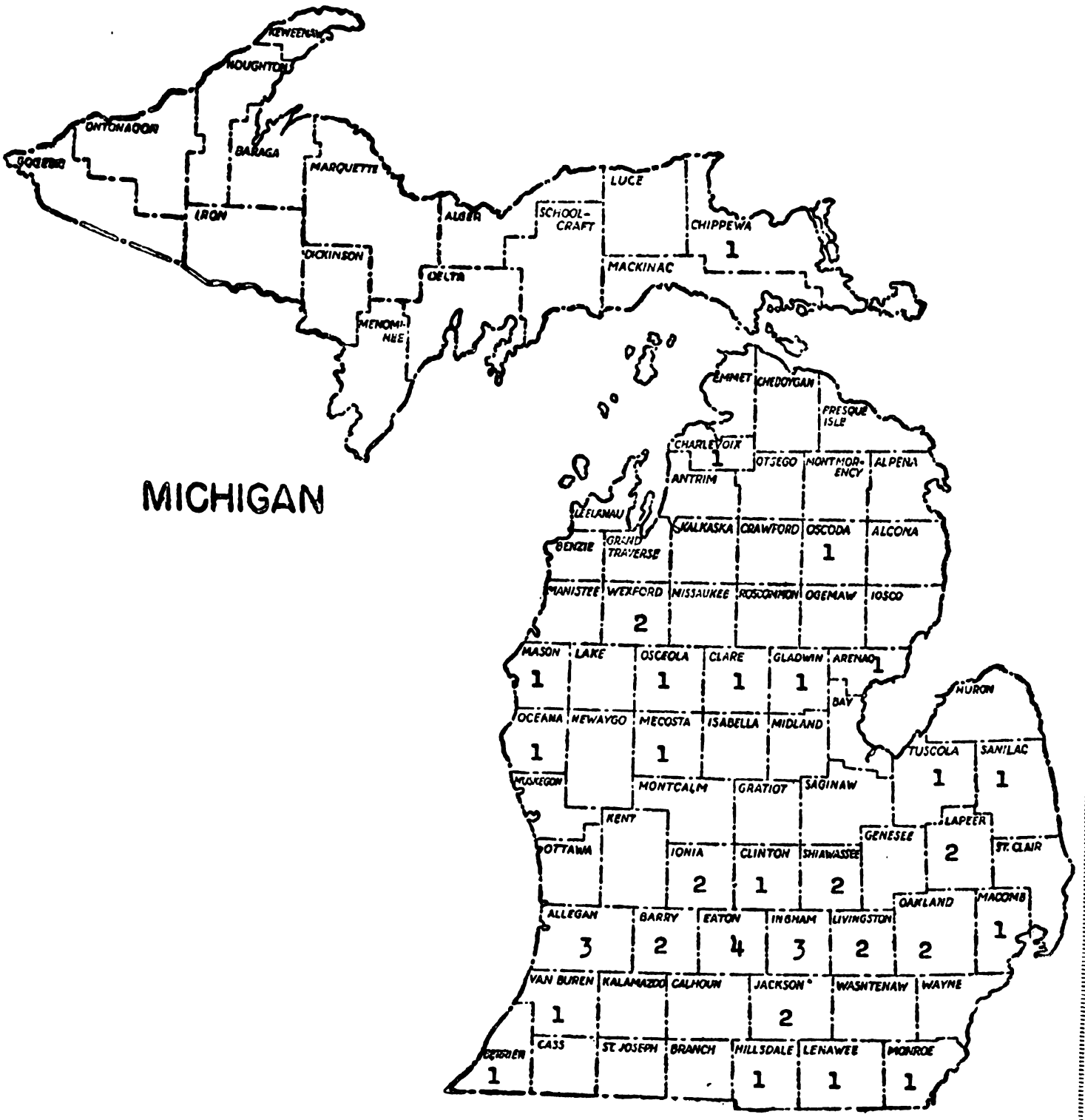
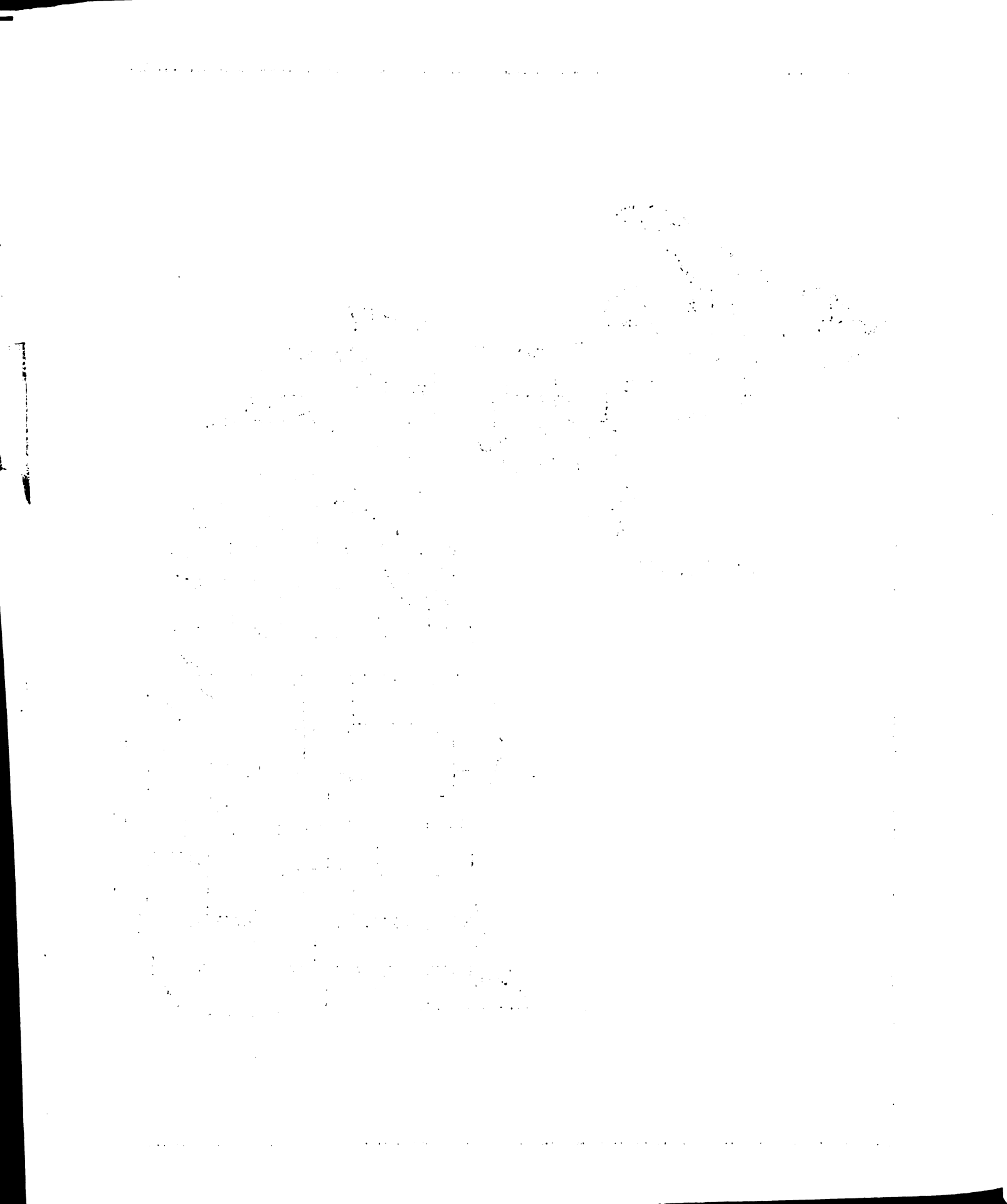


FIGURE 1

LOCATION BY COUNTIES OF THE 45 TEACHERS INCLUDED IN THE STUDY



Almost all east-and-west tiers of counties in the lower peninsula were represented by one or more teachers. One teacher was located in the upper peninsula in the county farthest east.

Analysis of Data

Data were analyzed to compare the two groups of teachers in each of the groupings just described as to the per cent of jobs they could do and as to the per cent of these jobs taught. These comparisons included a determinination of the significance of difference of the number of teachers in each group by using the chi-square technique.

The formula[4] used in the chi-square calculations is:

$$x^2 = \frac{(o-e)^2}{e}$$

The o in the formula represents observed frequencies in the distributions and the e represents the expected frequencies in the distributions.

If a cell combination was less than five, a correction factor .5 was subtracted from the quantity (o - e) before the quantity was squared. The significance of the values of chi-square was determined by referring to a Table of Chi-square.[5] The readings

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[4] Allen L. Edwards, Statistical Analysis, (New York: Rinehart and Company, Inc., 1946) p. 249.

[5] Ibid., p. 342.

were made at the five per cent level and with (r - 1) (k - 1) degrees of freedom; r represents the number of rows and k represents the number of columns in the tables of cell entries.

A correlation coefficient was calculated from the number of teachers who could do each manipulative job in each enterprise and the number of teachers who taught each of these jobs in each enterprise; similar calculations were made for the managerial jobs in each enterprise.

The formula[6] used in the correlation coefficient calculations is:

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{N}}{\sqrt{\Sigma X^2 - \frac{(\Sigma X)^2}{N}} \sqrt{\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}}}$$

The X in the formula represents the number of teachers who could do each job. The Y represents the number of teachers who taught each job. The N represents the number of pairs of items that were correlated.

The significance of the correlation coefficients was determined by the use of a Table of the Values of r.[7] The readings were made at the one per cent level and with N-2 degrees of freedom.

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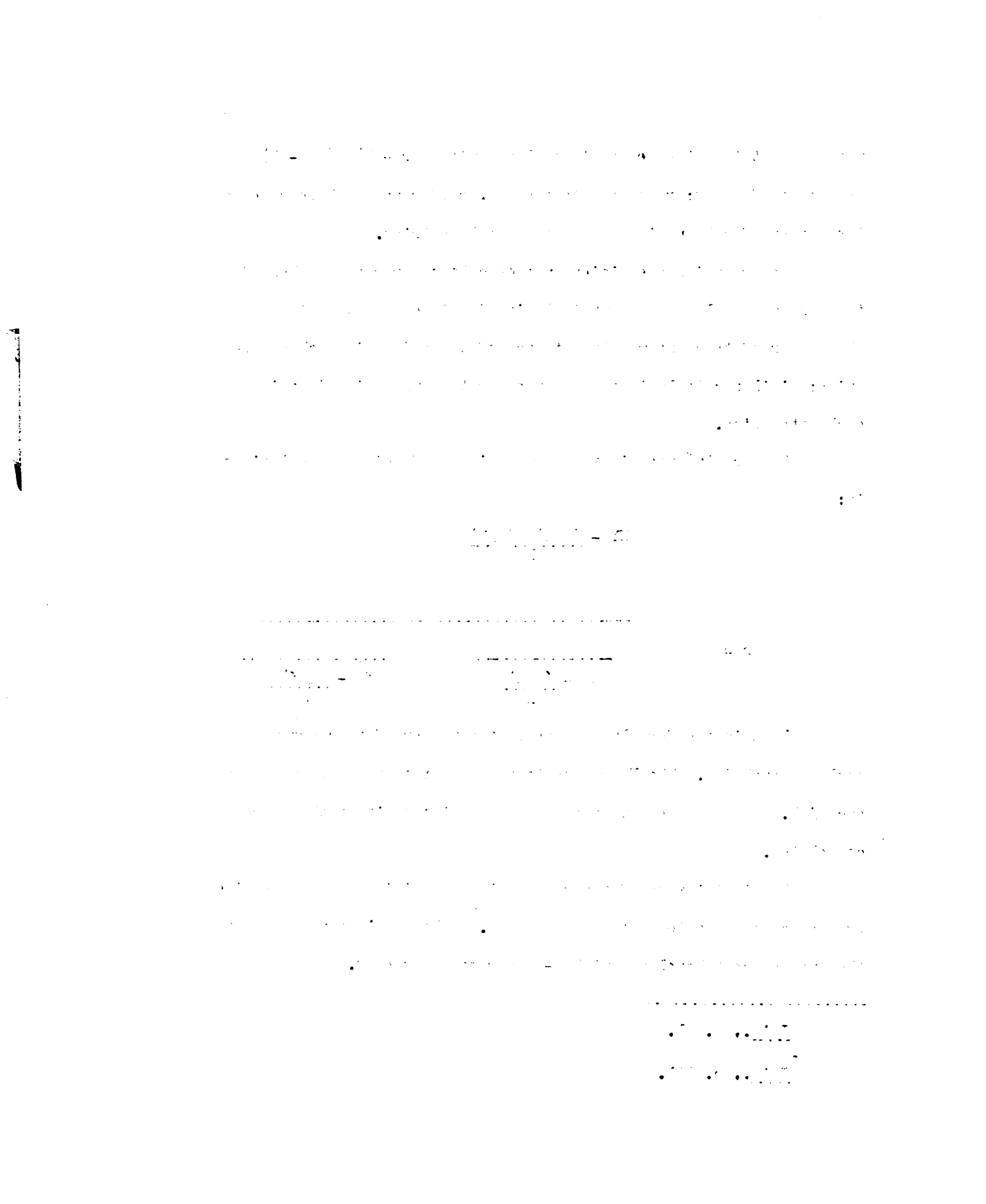
[6] Ibid., p. 91.

[7] Ibid., p. 331.



CHAPTER IV

MANIPULATIVE ABILITIES POSSESSED BY TEACHERS AND MANIPULATIVE JOBS TAUGHT

This chapter presents an analysis of data regarding manipulative abilities in beef-cattle, sheep, and swine enterprises possessed by teachers, and data regarding manipulative jobs taught in these livestock enterprises to students in vocational agriculture. The following questions will be answered in this chapter:

Did teachers who had 12 or more credits in animal husbandry possess more manipulative abilities in beef-cattle, sheep, and swine enterprises than teachers who had less than 12 credits in this subject? Did teachers who had less than 12 credits teach as many manipulative jobs in these enterprises as did teachers who had 12 or more credits in animal husbandry?

Were more of these abilities possessed by teachers who had more years of teaching experience than were possessed by teachers who had fewer years of teaching experience? Did teachers with more experience teach more manipulative jobs than did teachers with less experience?

Did teachers who were in important areas of livestock production possess more of these abilities than teachers who were in less-important areas of livestock production? Were more of the jobs taught by teachers who were in important areas of livestock production than than were taught by teachers who were in less-important areas of livestock production?

The analysis of data involves a comparison of teachers in each of three classifications that were made on the basis of: (1) number of credits in animal husbandry possessed by teachers, (2) number of years of experience as teachers of vocational agriculture, and (3) importance of livestock production in counties where teachers were located. Tests for the significance of difference between the number of teachers in each of the groups of teachers compared have been used at appropriate places. If a teacher indicated that he had performed and could demonstrate a job, it was considered that he possessed the ability to do that job.

Comparisons between "Majors" and "Non-Majors"

This section of the chapter deals with the two groupings of teachers made on the basis of number of credits in animal husbandry that they possessed. One group is designated as "majors" who had 12 or more credits in animal husbandry. The other group is designated as "non-majors" who had less than 12 credits in animal husbandry.

The 45 teachers included in the present study had an average of 12.7 term hours in animal husbandry; the range of credits in this subject was from three to 27 term hours. Converted into semester hours, the average was 8.4, exclusive of credits in dairy husbandry and poultry husbandry. The range in semester hours was from two to 18. Hayden reported that 360 teachers of vocational

agriculture in the United States had an average of 15.3 semester hours in animal husbandry, exclusive of credits in dairy husbandry and poultry husbandry; the range of credits in this subject was from two to 42 semester hours.[1]

TABLE IV

NUMBER OF MAJORS AND NON-MAJORS BY PER CENT OF MANIPULATIVE ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISES

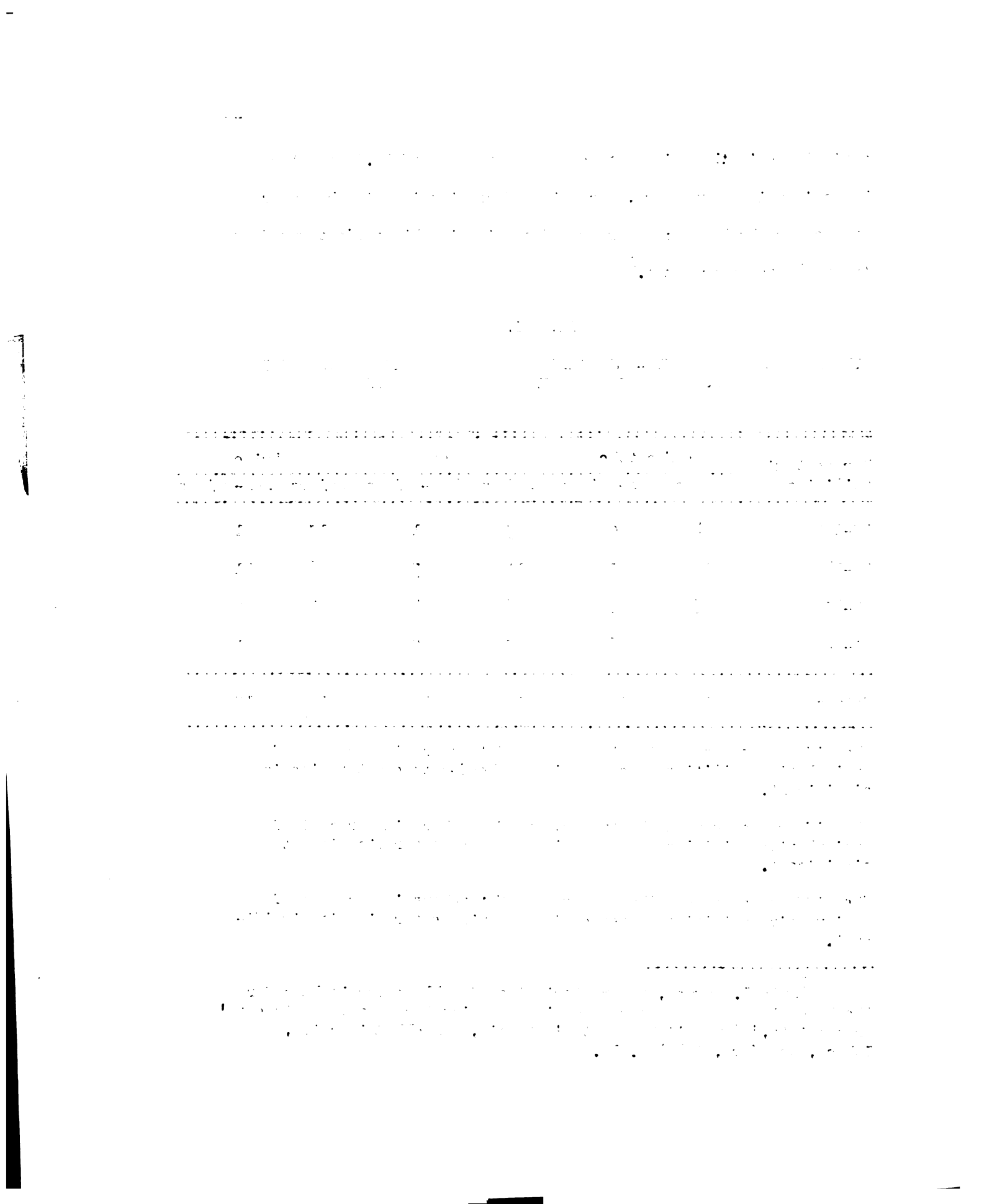
Per cent of abilities	Beef-cattle		Sheep		Swine	
	Majors	Non-majors	Majors	Non-majors	Majors	Non-majors
75-100	4	0	5	1	18	1
50-74	15	3	11	5	6	11
25-49	6	6	6	4	4	2
0-24	5	6	8	5	2	1
Totals	30	15	30	15	30	15

The difference between the two groups of teachers in per cent of manipulative abilities possessed in the beef-cattle enterprise is significant.

The difference between the two groups of teachers in per cent of manipulative abilities possessed in the sheep enterprise is not significant.

The difference between the two groups of teachers in per cent of manipulative abilities possessed in the swine enterprise is significant.

[1] Lyle J. Hayden, "Characteristics of College Curriculums for the Education of Teachers of Vocational Agriculture Based on Students' Transcripts," (unpublished Doctor's thesis, Cornell University, Ithaca, New York, 1945) p. 16.



The results of the analysis of data in Table IV show that teachers who had 12 or more credits in animal husbandry possessed a significantly higher per cent of manipulative abilities in the beef-cattle enterprise than teachers who had less than 12 credits in the subject. From Table IV it can be seen that 19 majors (or approximately 63 per cent) had 50 per cent or more of these abilities and only three non-majors (or 20 per cent) had 50 per cent or more of the abilities.

There was very little difference in the per cent of manipulative abilities in the sheep enterprise that majors possessed and the per cent of these abilities that non-majors possessed.

The analysis of data in Table IV reveals that majors possessed a much greater per cent of manipulative abilities in the swine enterprise than non-majors possessed. This table shows that 18 majors (or 60 per cent) had 75 per cent or more of the manipulative abilities in the enterprise, and only six non-majors (or 6.6 per cent) had 75 per cent or more of these abilities.

Only 24 of the 45 teachers included in the study taught manipulative jobs in the beef-cattle enterprise to out-of-school classes. There was a very small difference between the per cent of these abilities that the majors and the per cent of these abilities that the non-majors had. This small difference is in contrast to the difference found when a comparison was made of the per cent of

manipulative abilities in the beef-cattle enterprise possessed by all majors and all non-majors included in the study. In this latter comparison the difference was statistically significant.

Only 11 teachers taught manipulative jobs in the sheep enterprise to out-of-school classes and only one of these was a non-major. However, there was no difference in the per cent of abilities possessed by the two groups of teachers. Twenty teachers taught manipulative jobs in the swine enterprise to out-of-school classes. There was no difference in the per cent of these abilities possessed by majors and non-majors.

There was very little difference in the per cent of manipulative jobs taught by majors and non-majors in each enterprise to all-day classes. Table V shows that 16 majors (or 53 per cent) and nine non-majors (or 60 per cent) taught 50 per cent or more of the manipulative jobs in the beef-cattle enterprise to all-day classes. The table shows that 16 majors (or 53 per cent) and seven non-majors (or 47 per cent) taught 50 per cent of the manipulative jobs in the sheep enterprise to these classes. In the table it can be seen that 24 majors (or 80 per cent) and 13 non-majors (or 86 per cent) taught 50 per cent or more of the manipulative jobs in the swine enterprise to these classes.

Majors and non-majors taught about the same per cent of manipulative jobs in the beef-cattle enterprise to out-of-school

TABLE V

NUMBER OF MAJORS AND NON-MAJORS BY PER CENT OF MANIPULATIVE JOBS TAUGHT IN THE LIVESTOCK ENTERPRISES TO ALL-DAY CLASSES

Per cent of jobs	Beef-cattle		Sheep		Swine	
	Majors	Non-majors	Majors	Non-majors	Majors	Non-majors
75-100	2	1	4	4	13	3
50-74	14	8	12	2	11	10
25-49	10	3	5	3	4	2
0-24	4	3	9	6	2	0
Totals	30	15	30	15	30	15

The difference between the two groups of teachers in the per cent of manipulative jobs taught in each enterprise is not significant.

classes. There was no difference in the per cent of manipulative jobs taught by the two groups of teachers in the sheep enterprise to out-of-school classes. The two groups of teachers taught practically the same per cent of manipulative jobs in the swine enterprise to out-of-school classes.

Comparisons of data presented in this part of the chapter indicate that a lack of credits in animal husbandry was a handicap to teachers in two instances only. Teachers with 12 or more credits had a much higher per cent of manipulative abilities in the beef-

cattle enterprise and in the swine enterprise than teachers with less than 12 credits. The findings gave no indications that teachers had acquired more manipulative abilities in the sheep enterprise by taking a major in animal husbandry.

Comparisons between "More-experienced" Teachers and "Less-experienced" Teachers

This part of the chapter concerns two groupings of teachers made on the basis of the number of years they had taught. One group of teachers is designated as "more-experienced" teachers who had taught nine years or more. The other group is designated as "less-experienced" teachers who had taught less than nine years.

The difference was small between the per cent of manipulative abilities possessed by more-experienced teachers and less-experienced teachers in each enterprise. By comparing the number of teachers shown in Table VI it can be seen that 50 per cent of the more-experienced and 45 per cent of the less-experienced teachers had 50 per cent or more of the manipulative abilities in the beef-cattle enterprise. Also 50 per cent of the more-experienced teachers and 45 per cent of the less-experienced teachers possessed 50 per cent or more of the manipulative abilities in the sheep enterprise. The numbers in the table indicate that 75 per cent of the more-experienced teachers and 82 per cent of the less-experienced teachers possessed 50 per cent or more of the manipulative abilities in the swine enterprise.

TABLE VI

NUMBER OF MORE-EXPERIENCED TEACHERS AND LESS-EXPERIENCED TEACHERS BY PER CENT OF MANIPULATIVE ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISE

Per cent of abilities	Beef-cattle		Sheep		Swine	
	More-experienced	Less-experienced	More-experienced	Less-experienced	More-experienced	Less-experienced
75-100	0	4	3	3	13	6
50-74	14	4	11	5	9	8
25-49	7	5	6	4	3	3
0-24	7	4	8	5	3	0
Totals	28	17	28	17	28	17

The difference between the two groups of teachers in per cent of manipulative abilities possessed in each enterprise is not significant.

The difference in the per cent of these abilities possessed in the beef-cattle enterprise by the two groups, who taught out-of-school classes, was very small. This was also true of the two groups who taught manipulative jobs in the sheep and swine enterprises to out-of-school classes.

Table VII shows the number of more-experienced and the number of less-experienced teachers who taught the certain per cent of manipulative jobs in each enterprise to all-day classes. By converting these numbers to per cents, it can be seen that 57 per cent of more-

TABLE VI

NUMBER OF MORE-EXPERIENCED TEACHERS AND LESS-EXPERIENCED TEACHERS BY PER CENT OF MANIPULATIVE ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISE

	Beef-cattle		Sheep		Swine	
Per cent of abilities	More-experienced	Less-experienced	More-experienced	Less-experienced	More-experienced	Less-experienced
75-100	0	4	3	3	13	6
50-74	14	4	11	5	9	8
25-49	7	5	6	4	3	3
0-24	7	4	8	5	3	0
Totals	28	17	28	17	28	17

The difference between the two groups of teachers in per cent of manipulative abilities possessed in each enterprise is not significant.

The difference in the per cent of these abilities possessed in the beef-cattle enterprise by the two groups, who taught out-of-school classes, was very small. This was also true of the two groups who taught manipulative jobs in the sheep and swine enterprises to out-of-school classes.

Table VII shows the number of more-experienced and the number of less-experienced teachers who taught the certain per cent of manipulative jobs in each enterprise to all-day classes. By converting these numbers to per cents, it can be seen that 57 per cent of more-

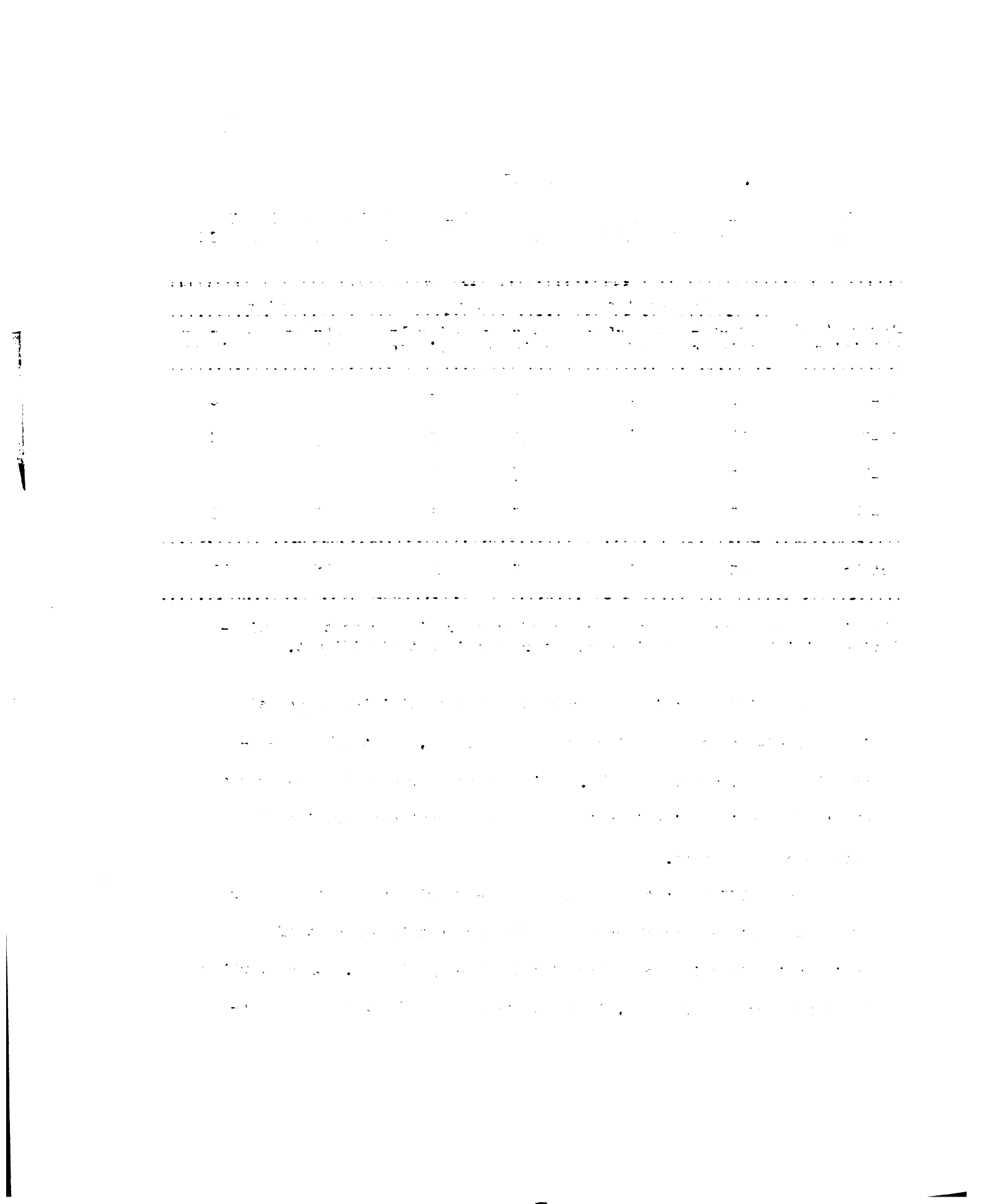


TABLE VII

NUMBER OF MORE-EXPERIENCED TEACHERS AND LESS-EXPERIENCED TEACHERS BY PER CENT OF MANIPULATIVE JOBS IN THE LIVESTOCK ENTERPRISES TAUGHT TO ALL-DAY CLASSES

Per cent of jobs	Beef-cattle		Sheep		Swine	
	More-experienced	Less-experienced	More-experienced	Less-experienced	More-experienced	Less-experienced
75-100	1	2	3	5	8	8
50-74	15	7	10	4	15	6
25-49	8	5	4	4	3	3
0-24	4	3	11	4	2	0
Totals	28	17	28	17	28	17

The difference between the two groups of teachers in the per cent of manipulative jobs taught in each enterprise is not significant.

experienced teachers and 53 per cent of less-experienced teachers taught 50 per cent or more of manipulative jobs in the beef-cattle enterprise to all-day classes. In the sheep enterprise 46 per cent of the more-experienced teachers and 53 per cent of the less-experienced teachers taught 50 per cent or more of the manipulative jobs to all-day classes. In the swine enterprise 82 per cent of each group of teachers taught 50 per cent or more of the manipulative jobs to these classes. The difference in the per cent of these jobs taught by the two groups of teachers was very small in each enterprise.

There was a small difference in the per cent of manipulative jobs taught by the two groups of teachers in each enterprise to out-of-school classes.

The analysis of data indicates that teachers must have developed most of their manipulative abilities in these livestock enterprises by the time they graduated from college or that they acquired them during their first three years of teaching vocational agriculture. All teachers included in the study had taught at least three years. However, it should be kept in the mind of the reader that these comparisons were between teachers with differing amounts of experience and not between the same men at different times of teaching. The results might have been different if comparisons could have been made between abilities of the more-experienced teachers and the abilities they had at a time when they would have been classified as less-experienced teachers. Seemingly, after the third year of teaching the per cent of manipulative jobs taught in each enterprise did not increase. These findings are very similar to those reported by MacDonald.[2]

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[2] Donald L. MacDonald, "Some Needed Improvements in the Montana Vocational Agriculture Program," (Unpublished Master's thesis, Montana State College, Bozeman, 1939) p. 23.

Comparisons between Teachers in "More-important" Areas and Teachers in "Less-important" Areas of Livestock Production

A presentation will be made of the two groupings of teachers made on the basis of importance of livestock production in the counties where they were located. A county to be considered as a "more-important" livestock county must have derived 19.59 per cent or more of its total farm income from beef-cattle, sheep, and swine during 1945. The groups are designated as teachers in "more-important" areas and teachers in "less-important" areas.

By referring to Table VIII it can be seen that 62 per cent (10) of the teachers in less-important areas possessed 50 per cent or more of the manipulative abilities in the beef-cattle enterprise, and 41 per cent (12) of the teachers in more-important areas possessed 50 per cent or more of these abilities. Though the difference in the per cent is not statistically significant, it is noticeable because teachers in areas where livestock was not so important had a higher per cent of these abilities than did teachers who were in important areas. In the more-important areas 45 per cent of the teachers had 50 per cent or more of the manipulative abilities in the sheep enterprise, and 50 per cent of the teachers in less-important areas had 50 per cent or more of these abilities. In comparing the manipulative abilities in the swine enterprise possessed by teachers in more-important areas and these abilities possessed by teachers

TABLE VIII

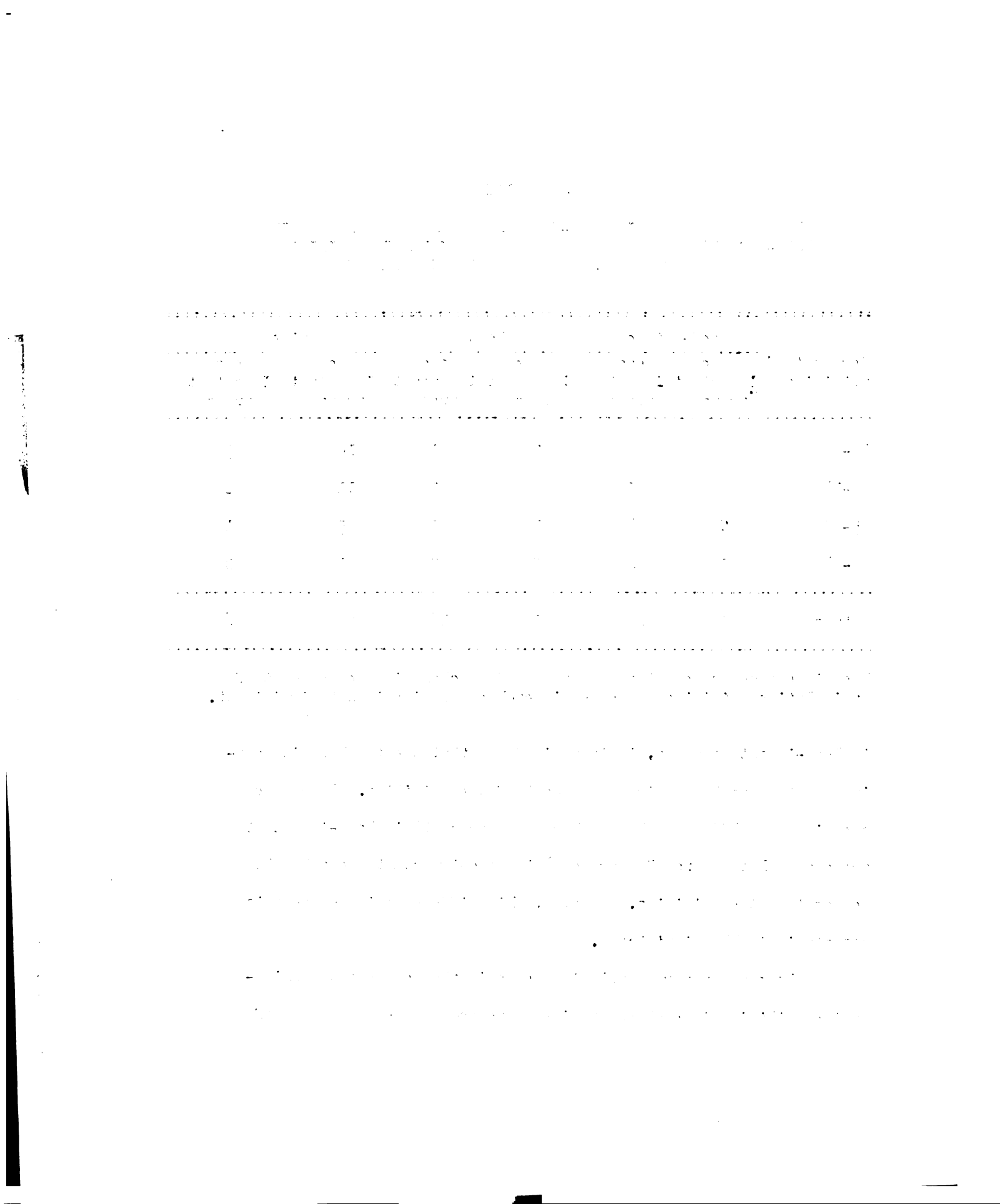
NUMBER OF TEACHERS IN MORE-IMPORTANT AREAS AND TEACHERS IN LESS-IMPORTANT AREAS BY PER CENT OF MANIPULATIVE ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISES

Per cent of abilities	Beef-cattle		Sheep		Swine	
	More-Important areas	Less-Important areas	More-Important areas	Less-Important areas	More-Important areas	Less-Important areas
75-100	3	1	5	1	10	9
50-74	9	9	9	7	11	6
25-49	8	4	7	3	5	1
0-24	9	2	8	5	3	0
Totals	29	16	29	16	29	16

The difference between the two groups of teachers in the per cent of manipulative abilities possessed in each enterprise is not significant.

in less-important areas, it is again found that the teachers in less-important areas had a higher per cent of the abilities. It can be seen in Table VIII that 15 teachers (93 per cent) in less-important areas and 21 teachers (72 per cent) in more-important areas had 50 per cent of the abilities. However, this difference in per cent is not statistically significant.

There was a very small difference in the per cent of manipulative abilities in each enterprise possessed by the two groups of



teachers who taught manipulative jobs in these enterprises to all-day classes.

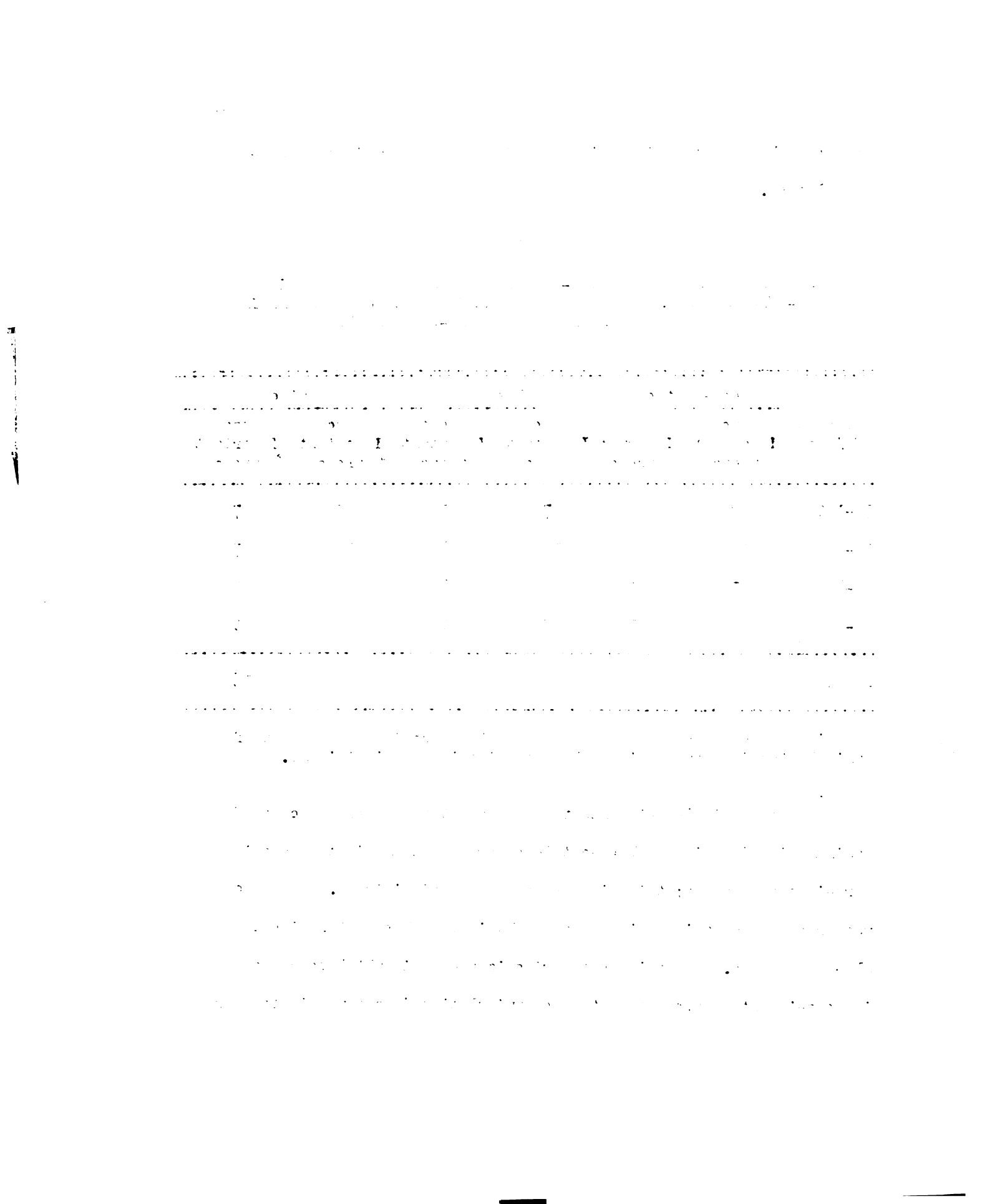
TABLE IX

NUMBER OF TEACHERS IN MORE-IMPORTANT AREAS AND TEACHERS IN LESS-IMPORTANT AREAS BY PER CENT OF MANIPULATIVE JOBS TAUGHT IN THE LIVESTOCK ENTERPRISES TO ALL-DAY CLASSES

	Beef-cattle		Sheep		Swine	
Per cent of jobs	More-important areas	Less-important areas	More-important areas	Less-important areas	More-important areas	Less-important areas
75-100	2	1	7	1	9	7
50-74	16	6	10	4	14	7
25-49	5	8	4	4	4	2
0-24	6	1	8	7	2	0
Totals	29	16	29	16	29	16

The difference between the two groups of teachers in the per cent of manipulative jobs taught in each enterprise is not significant.

Teachers in less-important areas taught a smaller per cent of manipulative jobs in the beef-cattle enterprise than did teachers in more-important areas; this difference was not significant. The same was true of the manipulative jobs taught in the sheep enterprise to all-day classes. The swine enterprise is a case in which teachers in less-important areas taught more manipulative jobs than did teachers



in more-important areas of livestock production. By referring to Table IX it can be seen that 14 teachers in less-important areas (87 per cent) and 23 teachers in more-important areas (79 per cent) taught 50 per cent or more of the manipulative jobs in the swine enterprise. However, this difference is not significant.

The difference in the per cent of jobs taught by these two groups of teachers in each enterprise to out-of-school classes was small.

The analysis of data in this part of the chapter does not indicate that teachers with more manipulative abilities in the livestock enterprises are teaching in more-important areas of livestock production. These data also reveal that teachers in more-important areas of livestock production are teaching only a slightly greater per cent of manipulative jobs in these enterprises than are teachers in less-important areas.

Summary

This chapter has made comparisons between groups of various teachers of vocational agriculture concerning the manipulative abilities in the beef-cattle, sheep, and swine enterprises that the teachers possessed and of manipulative jobs taught in these enterprises. These groupings were made according to: (1) number of credits in animal husbandry the teachers had, (2) number of years of experience as teachers of vocational agriculture and (3)

importance of livestock production in counties where teachers were located.

Of these comparisons there were only two in which there was a significant difference between groups of teachers compared. Teachers, who had 12 or more credits in animal husbandry, possessed a much greater per cent of manipulative abilities in the beef-cattle enterprise and in the swine enterprise than teachers, who had less than 12 credits in animal husbandry, possessed.

CHAPTER V

MANAGERIAL ABILITIES POSSESSED BY TEACHERS AND MANAGERIAL JOBS TAUGHT

In this chapter will be presented the results of the study pertaining to managerial abilities possessed and managerial jobs taught in beef-cattle, sheep, and swine enterprises. Questions similar to those in the first part of chapter four would be appropriate here except that they would concern managerial abilities and jobs instead of manipulative abilities and jobs. These questions will be answered:

Did teachers who had 12 or more credits in animal husbandry possess more managerial abilities in beef-cattle, sheep, and swine enterprises than did teachers who had less than 12 credits? Did teachers who had 12 or more credits teach more managerial jobs in these enterprises than did teachers who had less than 12 credits in animal husbandry?

Did teachers who had fewer years of teaching experience possess as many of these abilities as were possessed by teachers who had more years of teaching experience? Did teachers with more experience teach more of the managerial jobs than did teachers with less experience?

Were more of these managerial abilities possessed by teachers who were in important areas of livestock production than

were possessed by teachers who were in less-important areas of livestock production? Were as many of the jobs taught by teachers who were in less-important areas of livestock production as were taught by teachers who were in important areas of livestock production?

The analysis of data includes comparisons of teachers in each of the classifications that were made on the basis of the following factors: (1) number of credits in animal husbandry possessed by teachers, (2) number of years of experience as teachers of vocational agriculture, and (3) importance of livestock production in counties where teachers were located. These are the same classifications made in Chapter IV dealing with manipulative jobs. Chi-square tests for the significance of differences have been used at appropriate places. If a teacher indicated that he felt qualified to teach a managerial job, it was considered that he possessed the ability to do the job.

Comparisons between "Majors" and "Non-majors"

In this part of the chapter will be presented the results of the two groupings of teachers made according to the number of credits in animal husbandry that they possessed. The "majors" had 12 or more credits and the "non-majors" had less than 12 credits in animal husbandry.

TABLE X

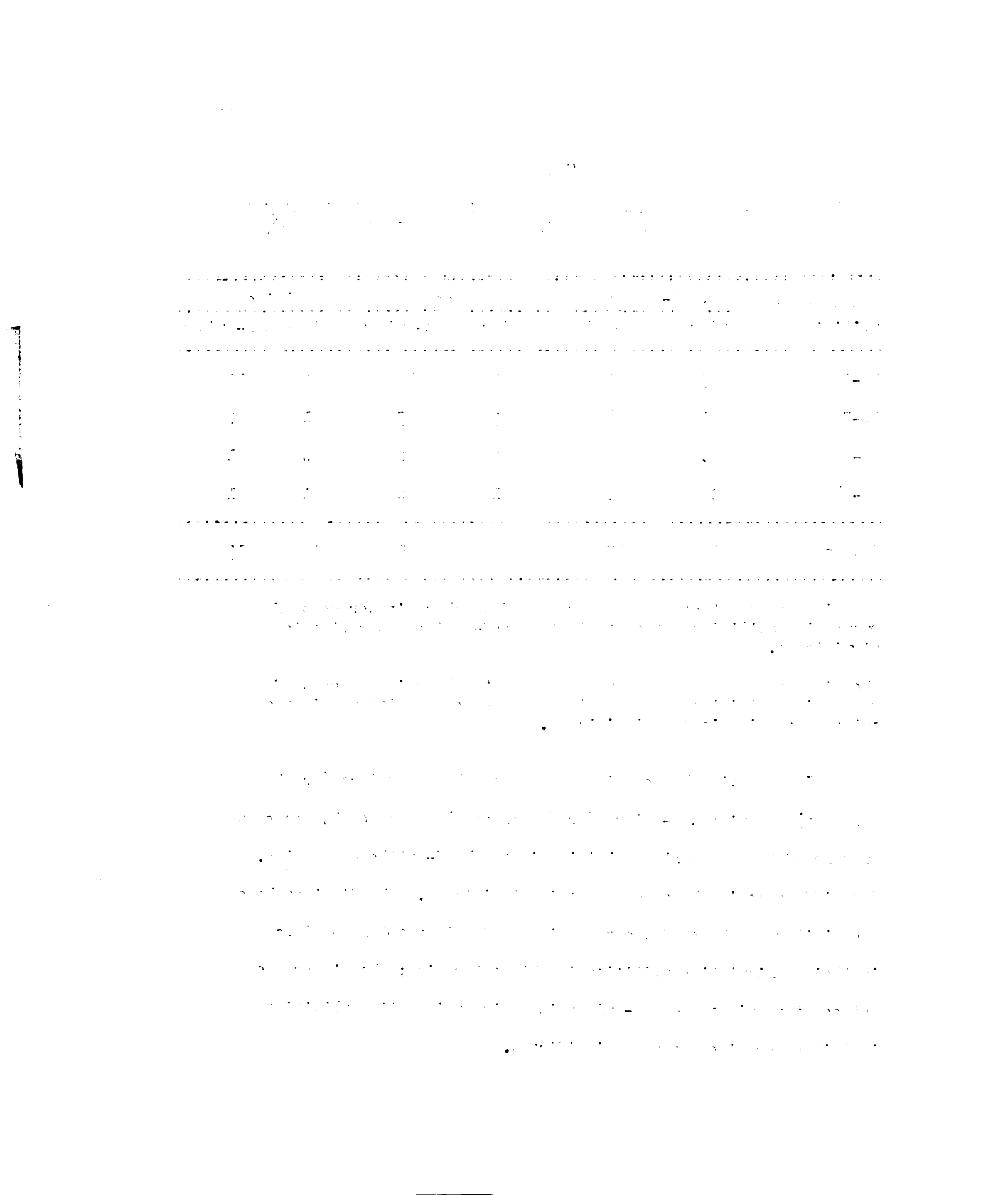
NUMBER OF MAJORS AND NON-MAJORS BY PER CENT OF MANAGERIAL ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISES

Per cent of abilities	Beef-cattle		Sheep		Swine	
	Majors	Non-majors	Majors	Non-majors	Majors	Non-majors
75-100	29	9	22	10	28	13
50-74	1	4	5	3	1	0
25-49	0	2	2	2	0	1
0-24	0	0	1	0	1	1
Totals	30	15	30	15	30	15

The difference between the two groups of teachers in per cent of managerial abilities possessed in the beef-cattle enterprise is significant.

The difference between the two groups of teachers in per cent of managerial abilities possessed in the sheep enterprise and in the swine enterprise is not significant.

In observing Table X it can be seen that 29 majors (or 97 per cent) and nine non-majors (or 60 per cent) possessed 75 per cent or more of the managerial abilities in the beef-cattle enterprise. The difference in these per cents is significant. The findings here are similar to those of the comparisons of majors and non-majors in their manipulative abilities in this enterprise; the difference between the majors and non-majors in their manipulative abilities in this enterprise was also significant.



Approximately 90 per cent of the teachers in each group had 50 per cent or more of the managerial abilities in the sheep enterprise. Table X shows that 29 majors (or 90 per cent) and 13 non-majors (or 87 per cent) possessed 50 per cent or more of the managerial abilities in the swine enterprise. This is a comparatively small difference in the per cent of these abilities possessed by the two groups of teachers.

Of the 15 teachers who taught managerial jobs in the beef-cattle enterprise to out-of-school classes, all of the majors and all of the non-majors had 50 per cent or more of the managerial abilities in this enterprise. The same was true of the 15 majors and non-majors who taught managerial jobs in the sheep enterprise to out-of-school classes. Also the 23 majors and non-majors, who taught managerial jobs in the swine enterprise to out-of-school classes, possessed 50 per cent or more of the managerial abilities in this enterprise.

In Table XI it can be seen that 26 majors (or 87 per cent) and nine non-majors (or 60 per cent) taught 50 per cent or more of the managerial jobs in the beef-cattle enterprise to all-day classes. The 27 per cent difference between the two groups of teachers, who taught 50 per cent or more of the managerial jobs, is not significant. There was a very small difference between the per cent of managerial jobs taught by the majors in the sheep

TABLE XI

NUMBER OF MAJORS AND NON-MAJORS BY PER CENT OF MANAGERIAL JOBS TAUGHT IN THE LIVESTOCK ENTERPRISES TO ALL-DAY CLASSES

Per cent of jobs	Beef-cattle		Sheep		Swine	
	Majors	Non-majors	Majors	Non-majors	Majors	Non-majors
75-100	21	9	18	11	29	13
50-74	5	0	6	2	0	1
25-49	0	5	2	1	0	0
0-24	4	1	4	1	1	1
Totals	30	15	30	15	30	15

The difference between the two groups of teachers in the per cent of managerial jobs taught in each enterprise is not significant.

enterprise and the per cent of these jobs taught by the non-majors in this enterprise to all-day classes. The two groups of teachers taught approximately the same per cent of managerial jobs in the swine enterprise to all-day classes.

Comparisons of data presented in this part of the chapter indicate that possession of a major field of interest in animal husbandry was of a special benefit in one of six cases. Teachers with 12 or more credits in animal husbandry possessed a much greater per cent of managerial abilities in the beef-cattle enter-

prise than did teachers with less than 12 credits in animal husbandry. The findings gave no indications that teachers had acquired more managerial abilities in the sheep and swine enterprises by taking a major in animal husbandry. The teachers with less than 12 credits in animal husbandry taught practically the same per cent of managerial jobs in these enterprises as did the teachers with 12 or more credits in the subject.

Comparisons between "More-experienced" Teachers and "Less-experienced" Teachers

This section of the chapter compares the "more-experienced" teachers who had taught nine or more years and the "less-experienced" teachers who had taught less than nine years.

The difference in per cent of managerial abilities in the beef-cattle enterprise possessed by teachers who had taught nine or more years and the per cent of these abilities possessed by teachers who had taught less than nine years was small. However, it can be seen in Table XII that 17 less-experienced teachers (or 100 per cent) and 26 more-experienced teachers (or 92 per cent) had 50 per cent or more of these abilities.

The more-experienced teachers possessed approximately the same per cent of managerial abilities in the sheep enterprise as the less-experienced teachers possessed. The swine enterprise is

TABLE XII

NUMBER OF MORE-EXPERIENCED TEACHERS AND LESS-EXPERIENCED TEACHERS BY PER CENT OF MANAGERIAL ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISES

	Beef-cattle		Sheep		Swine	
Per cent of abilities	More-experienced	Less-experienced	More-experienced	Less-experienced	More-experienced	Less-experienced
75-100	22	16	20	12	24	17
50-74	4	1	4	4	1	0
25-49	2	0	4	0	1	0
0-24	0	0	0	1	2	0
Totals	28	17	28	17	28	17

The difference between the two groups of teachers in per cent of managerial abilities possessed in each enterprise is not significant.

another case in which the less-experienced teachers possessed slightly more of the managerial abilities than did the more-experienced teachers. Table XII shows that 17 less-experienced teachers (or 100 per cent) and 25 more-experienced teachers (or 88 per cent) possessed 50 per cent or more of these abilities.

All of the teachers, who taught managerial jobs to out-of-school classes, possessed 50 per cent or more of the managerial abilities in each enterprise.

TABLE XIII

NUMBER OF MORE-EXPERIENCED TEACHERS AND LESS-EXPERIENCED TEACHERS BY PER CENT OF MANAGERIAL JOBS IN THE LIVESTOCK ENTERPRISES TAUGHT TO ALL-DAY CLASSES

	Beef-cattle		Sheep		Swine	
Per cent of jobs	More-experienced	Less-experienced	More-experienced	Less-experienced	More-experienced	Less-experienced
75-100	17	13	19	10	25	17
50-74	3	2	4	4	1	0
25-49	4	1	3	0	0	0
0-24	4	1	2	3	2	0
Totals	28	17	28	17	28	17

The difference between the two groups of teachers in the per cent of managerial jobs taught in each enterprise is not significant.

There was very little difference between the two groups of teachers in the per cent of managerial jobs taught in each enterprise to all-day classes. However, the less-experienced teachers taught a slightly higher per cent of these jobs in the beef-cattle enterprise and in the swine enterprise than did the more-experienced teachers. Table XIII shows that 15 less-experienced teachers (or 88 per cent) and 20 more-experienced (or 71 per cent) taught 50 per cent or more of the managerial jobs in the beef-cattle enterprise. In the swine enterprise, 17 less-experienced teachers (or 100 per

cent) and 26 more-experienced teachers (or 92 per cent) taught 50 per cent or more of the managerial jobs. In the sheep enterprise 82 per cent of the teachers in both groups taught 50 per cent or more of the managerial jobs to all-day classes. There was a very small difference in the per cent of jobs taught by the two groups of teachers in each enterprise to out-of-school classes.

The analysis of data presented would indicate that these teachers possessed most of their managerial abilities when they graduated from college or that they had acquired them during their first three years of teaching vocational agriculture. However, the results might be opposite of those presented, if comparisons were to be made of the abilities possessed by the more-experienced teachers and the abilities that they possessed when they were less-experienced teachers. Also, the results might be different if comparisons were to be made of the abilities of the less-experienced teachers and the abilities that they would have when they become more-experienced teachers. The analysis of data also revealed that the less-experienced teachers taught as many managerial jobs in these enterprises as were taught by the more-experienced teachers.

Comparisons between Teachers in "More-important" Areas and Teachers in "Less-important" Areas of Livestock Production

The last part of the chapter presents the results of the study pertaining to the teachers who were in "more-important" areas of

livestock production and teachers who were in "less-important" areas of livestock production. It was considered that a teacher was in a "more-important" area of livestock production if the county where he was located derived at least 19.89 per cent of its total farm income from beef-cattle, sheep, and swine during 1945.

TABLE XIV

NUMBER OF TEACHERS IN MORE-IMPORTANT AREAS AND TEACHERS IN LESS-IMPORTANT AREAS BY PER CENT OF MANAGERIAL ABILITIES POSSESSED IN THE LIVESTOCK ENTERPRISES

	Beef-cattle		Sheep		Swine	
Per cent of abilities	More-important areas	Less-important areas	More-important areas	Less-important areas	More-important areas	Less-important areas
75-100	24	14	20	12	26	15
50-74	4	1	6	2	1	0
25-49	1	1	3	1	1	0
0-24	0	0	0	1	1	1
Totals	29	16	29	16	29	16

The difference between the two groups of teachers in the per cent of managerial abilities possessed in each enterprise is not significant.

There was very little difference in the per cent of managerial abilities in the beef-cattle and sheep enterprises possessed by teachers in more-important areas and teachers in less-important areas. The teachers in more-important areas had approximately the same per cent of managerial abilities in the swine enterprise as did teachers in less-important areas. Table XIV shows that 28 teachers in more-important areas (or 96 per cent) and 15 teachers in less-important areas (or 93 per cent) possessed 50 per cent or more of these abilities in the beef-cattle enterprise. In the sheep enterprise 26 teachers in more-important areas (or 89 per cent) and 14 teachers in less-important areas (or 87 per cent) had 50 per cent or more of the managerial abilities. In the swine enterprise 27 teachers in more-important areas and 15 teachers in less-important areas (or 93 per cent of the teachers in each group) possessed 50 per cent or more of the managerial abilities.

All of the teachers in each area, who taught managerial jobs in these enterprises to out-of-school classes, possessed 50 per cent or more of the managerial abilities in each enterprise.

There was very little difference in the per cent of managerial jobs taught by the two groups of teachers in each enterprise to all-day classes. Seventy-seven per cent of the teachers in more-important areas and 75 per cent of the teachers in less-important areas taught managerial jobs in the beef-cattle enterprise to these classes. In

TABLE XV

NUMBER OF TEACHERS IN MORE-IMPORTANT AREAS AND TEACHERS IN LESS-IMPORTANT AREAS BY PER CENT OF MANAGERIAL JOBS TAUGHT IN EACH LIVESTOCK ENTERPRISE TO ALL-DAY CLASSES

	Beef-cattle		Sheep		Swine	
Per cent of jobs	More-important areas	Less-important areas	More-important areas	Less-important areas	More-important areas	Less-important areas
75-100	20	10	22	7	28	14
50-74	3	2	3	5	0	1
25-49	4	1	2	1	0	0
0-24	2	3	2	3	1	1
Totals	29	16	29	16	29	16

The difference between the two groups of teachers in the per cent of managerial jobs taught in each enterprise to all-day classes is not significant.

the sheep enterprise 86 per cent of the teachers in more-important areas and 75 per cent of the teachers in less-important areas taught 50 per cent or more of the managerial jobs to all-day classes. In the swine enterprise 95 per cent of the teachers in more-important areas and 93 per cent of the teachers in less-important areas taught managerial jobs to these classes.

All of the teachers in each group taught 50 per cent or more of the managerial jobs in each enterprise to out-of-school classes.

According to the results of the study just presented, teachers in less-important areas of livestock production were as well qualified to do managerial jobs in the livestock enterprises as were the teachers in more-important areas of livestock production. They also taught as many of these jobs as did teachers in more-important areas.

Summary

In this chapter comparisons have been presented in groupings of teachers of vocational agriculture based on these factors: (1) number of credits in animal husbandry possessed by the teachers, (2) number of years of experience as teachers of vocational agriculture, and (3) importance of livestock production in counties where teachers were located.

In the comparisons made, there was only one case of a significant difference between the two groups of teachers in the per cent of managerial abilities they possessed. The teachers who had 12 or more credits in animal husbandry possessed a significantly greater per cent of managerial abilities in the beef-cattle enterprise than did the teachers who had less than 12 credits in animal husbandry. In none of the comparisons made was there a significant difference between the two groups of teachers in the per cent of managerial jobs taught in the livestock enterprises.

CHAPTER VI

COMPARISONS OF TYPES OF ABILITIES POSSESSED BY TEACHERS, COMPARISONS OF TYPES OF JOBS TAUGHT, AND CORRELATIONS BETWEEN ABILITIES POSSESSED AND JOBS TAUGHT IN EACH ENTERPRISE

This chapter will present comparisons between types of abilities possessed by teachers in each livestock enterprise and comparisons between types of jobs taught in each enterprise. Type of abilities refers to manipulative abilities and managerial abilities and type of jobs refers to manipulative jobs and managerial jobs. Data will be presented showing the correlations between abilities to do jobs and jobs taught in each enterprise.

Some questions which should be answered by the results of analysis of data presented in this chapter are: Did teachers of vocational agriculture possess more managerial abilities in a livestock enterprise than manipulative abilities in the same enterprise? Was there any difference between the per cent of manipulative jobs and the per cent of managerial jobs taught in any of the livestock enterprises? Were about the same number of jobs taught in each livestock enterprise that teachers were qualified to perform?

Comparisons between Manipulative Abilities and Managerial Abilities

This part of the chapter will make comparisons between the per cent of manipulative abilities and the per cent of managerial abilities of teachers possessed in each enterprise.

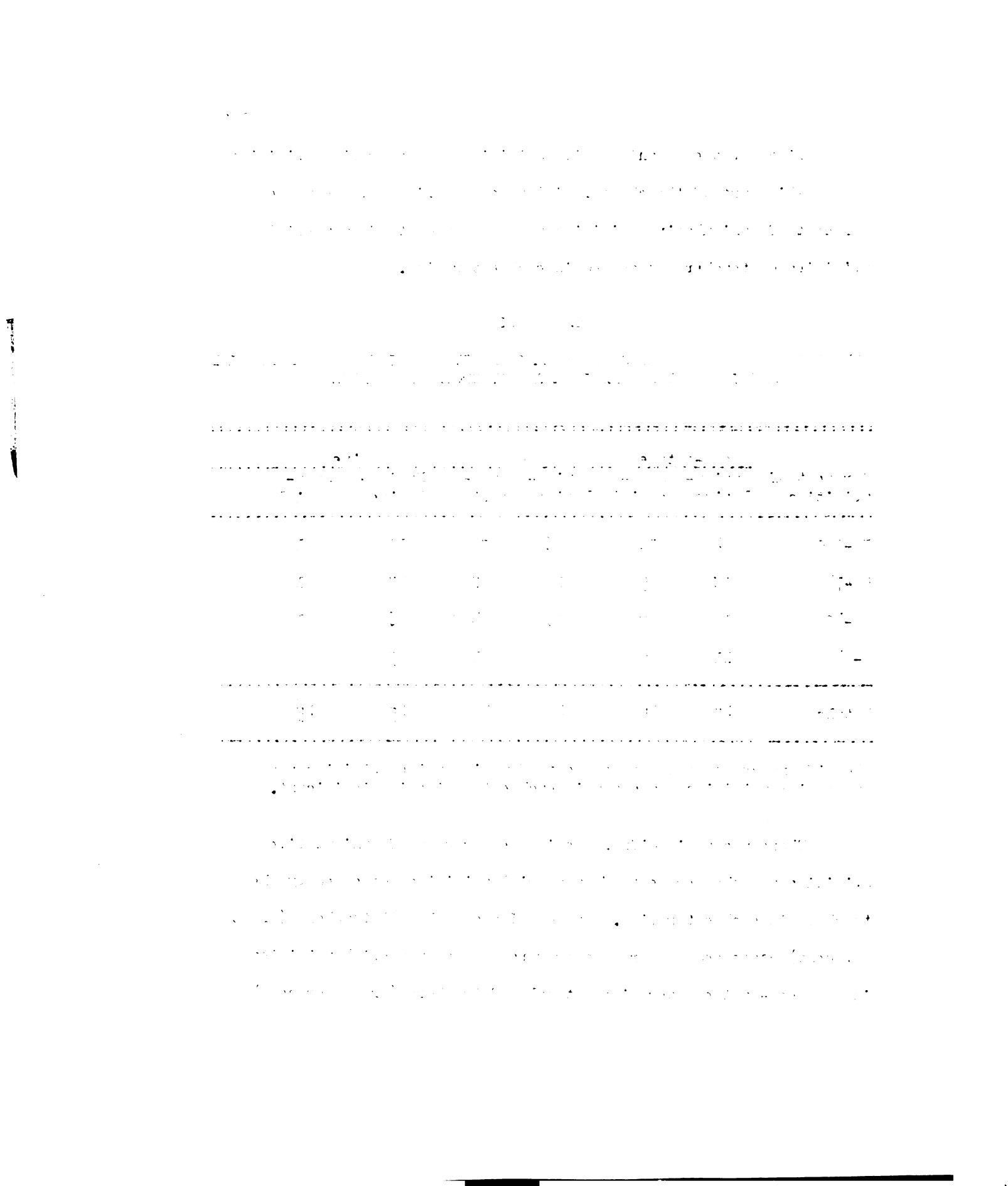
TABLE XVI

NUMBER OF TEACHERS BY PER CENT OF MANIPULATIVE ABILITIES AND MANAGERIAL ABILITIES POSSESSED IN EACH LIVESTOCK ENTERPRISE

	Beef-cattle		Sheep		Swine	
Per cent of abilities	Manipu-lative	Mana-gerial	Manipu-lative	Mana-gerial	Manipu-lative	Mana-gerial
75-100	4	38	6	32	19	41
50-74	18	5	16	8	17	1
25-49	12	2	10	4	6	1
0-24	11	0	13	1	3	2
Totals	45	45	45	45	45	45

The difference between the per cent of manipulative abilities and managerial abilities possessed in each enterprise is significant.

There was a big difference in the per cent of manipulative abilities and the per cent of managerial abilities possessed by the teachers in each enterprise. Table XVI shows that 43 teachers (or 96 per cent) possessed 50 per cent or more of the managerial abilities in the beef-cattle enterprise but only 22 teachers (or 50 per cent)



possessed 50 per cent or more of the manipulative abilities in this enterprise. In Table XVI it is shown that 40 teachers (or 80 per cent) had 50 per cent or more of the managerial abilities in the sheep enterprise but only 22 teachers (or 50 per cent) had 50 per cent or more of the manipulative abilities in this enterprise. Table XVI shows that 41 teachers (or 91 per cent) possessed 75 per cent or more of the managerial abilities in the swine enterprise and only 19 teachers (or 42 per cent) possessed 75 per cent or more of the manipulative abilities in this enterprise. The large differences in per cent of managerial abilities and per cent of manipulative abilities possessed in each enterprise indicates that the teachers were qualified to do a much larger per cent of managerial jobs than of manipulative jobs in all three enterprises.

Comparisons between Manipulative Jobs and Managerial Jobs Taught

In this part of the chapter will be presented comparisons between the per cent of manipulative jobs and the per cent of managerial jobs taught in each enterprise to all-day classes.

By referring to Table XVII it can be seen that 35 teachers (or 77 per cent) taught 50 per cent or more of the managerial jobs in the beef-cattle enterprise to all-day classes and that 25 teachers (or 56 per cent) taught 50 per cent or more of the manipulative jobs in this enterprise to all-day classes. In Table XVII it is indicated that 37 teachers (or 82 per cent) taught 50 per cent

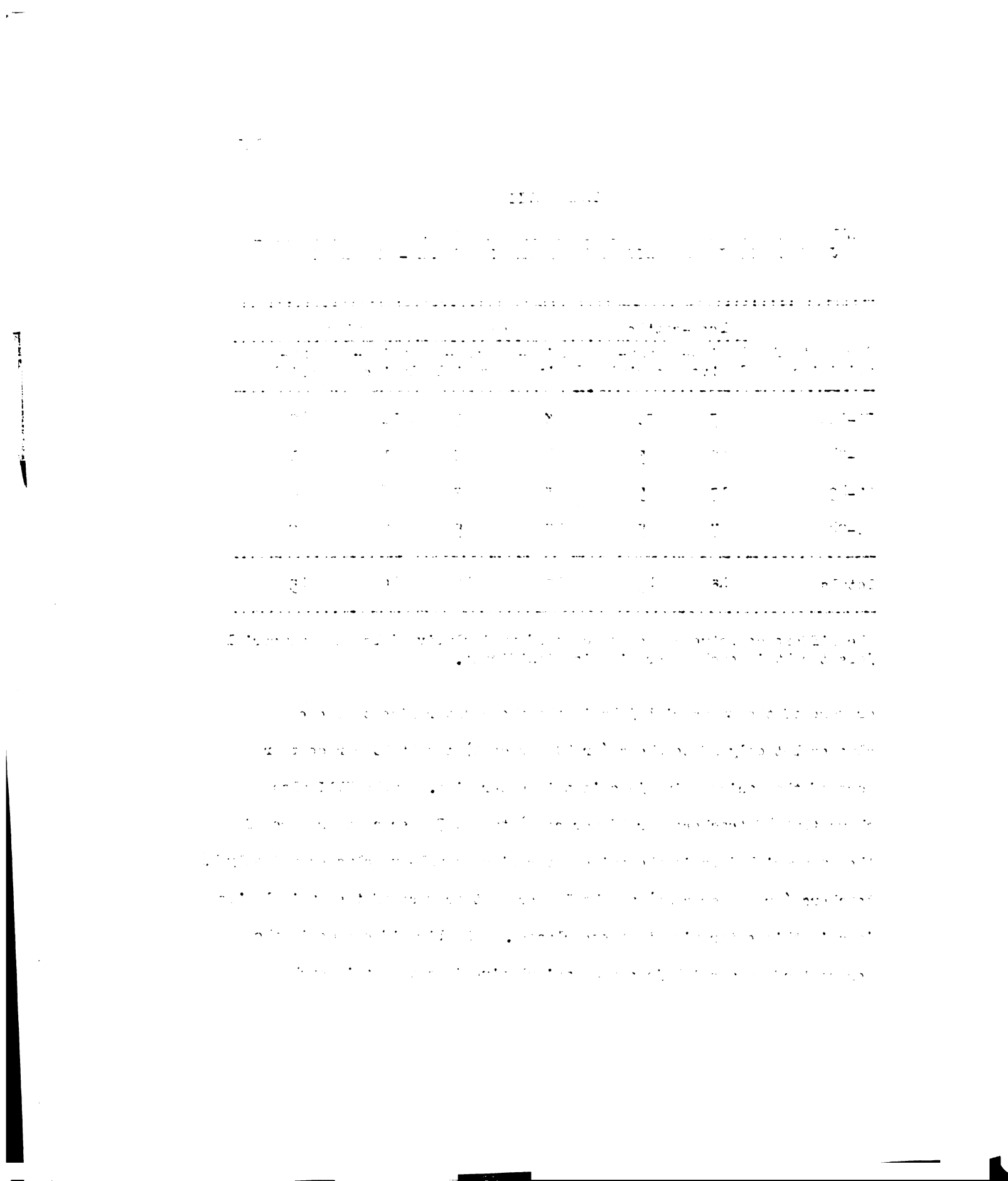
TABLE XVII

NUMBER OF TEACHERS BY PER CENT OF MANIPULATIVE JOBS AND MANAGERIAL JOBS TAUGHT IN EACH LIVESTOCK ENTERPRISE TO ALL-DAY CLASSES

	Beef-cattle		Sheep		Swine	
Per cent of abilities	Manipu-lative	Mana-gerial	Manipu-lative	Mana-gerial	Manipu-lative	Mana-gerial
75-100	3	30	8	29	16	42
50-74	22	5	14	8	21	1
25-49	13	5	8	3	6	0
0-24	7	5	15	5	2	2
Totals	45	45	45	45	45	45

The difference between the per cent of manipulative jobs and managerial jobs taught in each enterprise is significant.

or more of the managerial jobs in the sheep enterprise to these classes but only 22 teachers (or 50 per cent) taught 50 per cent or more of the manipulative jobs in this enterprise. Table XVII also shows that 42 teachers (or 93 per cent) taught 75 per cent or more of the managerial jobs in the swine enterprise to all-day classes and only 16 teachers (or 35 per cent) taught 75 per cent or more of the manipulative jobs in this enterprise to these classes. The big difference in the per cent of managerial jobs and manipulative jobs taught in each



enterprise indicates that more managerial jobs were taught in the livestock enterprises than manipulative jobs were taught in these enterprises to all-day classes.

Correlations between Abilities Possessed by Teachers and Jobs Taught

This part of the chapter will present data in Tables XVIII to XXIII showing the number of teachers who had ability to do each job, the number of teachers who taught each job to all-day classes, and the number who taught each job to out-of-school classes. These data include manipulative jobs and managerial jobs in each livestock enterprise. This procedure is another method of analysing phenomena previously analyzed in chapters four and five and the first part of the present chapter.

From these data were calculated correlation coefficients between jobs the teachers could do and the jobs that were taught. These calculations were made for manipulative jobs and for managerial jobs in each livestock enterprise included in the study.

The jobs in each enterprise were ranked according to the largest number of teachers who reported that they could do the jobs. These rankings indicate the jobs that could be done by the largest number and the smallest number of teachers. The rankings also give somewhat of an indication of the areas of animal husbandry in which teachers were the most capable and the least capable of doing jobs.

TABLE XVIII

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANIPULATIVE JOBS IN THE BEEF-CATTLE ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS TO OUT-OF-SCHOOL CLASSES

Rank in ability of teachers	Jobs	Could do	Taught to	
			All-day classes	Out-of-school classes
1.	"Dehorning" calves with caustic, horn spoon or electric dehorner	39	37	19
2.	Disinfecting the navel of calves	35	34	13
4.5	Treating calves for scours	32	32	18
4.5	Removing grubs from beef-animals	32	31	11
4.5	Treating beef animals for lice	32	35	17
4.5	Fitting beef animals for show	32	34	5
7.	Showing beef animals	28	31	4
8.	Castrating bull calves	27	27	12
9.	Treating for ringworm	24	21	5
10.	Placing rings in the noses of bulls	22	20	11
11.5	Treating beef animals for bleat	20	16	6
11.5	Tatooing or tagging calves	20	20	5
13.	Assisting cows at parturition	19	21	9
14.	Throwing beef animals by the rope method	15	5	15
15.	Dehorning mature beef animals	12	12	7
16.5	Treating beef animals for foot rot	9	8	3
16.5	Trimming hooves of beef animals	9	18	8
18.	Taking temperature of beef animals	8	5	5
19.	Butchering beef animals	7	12	2
20.	Cutting up beef carcasses	6	7	2
21.	Treating animals for pinkeye	5	6	5
22.	Taking pulse of beef animals	2	1	2

The correlation coefficient between jobs the teachers could do and jobs taught to all-day classes is .967, which is significant.

The correlation coefficient between the jobs teachers could do and jobs taught to out-of-school classes is .837, which is significant.

Calculations made from data in Table XVIII give a statistically significant correlation of .967 between manipulative jobs that teachers could do and manipulative jobs taught in the beef-cattle enterprise to all-day classes. These calculations also resulted in a significant correlation of .837 between manipulative jobs that teachers could do and manipulative jobs taught in this enterprise to out-of-school classes. These significant correlations indicate that manipulative jobs taught in the beef-cattle enterprise were about the same as those in which teachers possessed manipulative abilities. Table XVIII shows that the largest number of teachers who could do a manipulative job in the beef-cattle enterprise was 39 and the smallest number who could perform any of these jobs was two.

From the data in Table XIX, the correlation coefficient between the number of teachers who could do manipulative jobs in the sheep enterprise and the number of teachers who taught these jobs to all-day classes was found to be .959 which is highly significant. The analysis of data in Table XIX resulted in a correlation coefficient of .615 between the number of teachers who could do the jobs and the number who taught these jobs to out-of-school classes. These significant correlation coefficients indicate that manipulative jobs taught in the sheep enterprise were mostly those that teachers were able to perform. In Table XIX, it can be seen that two manipulative jobs in the sheep enterprise could be done by 33 teachers and one manipulative job in this enterprise could be done by only one teacher.

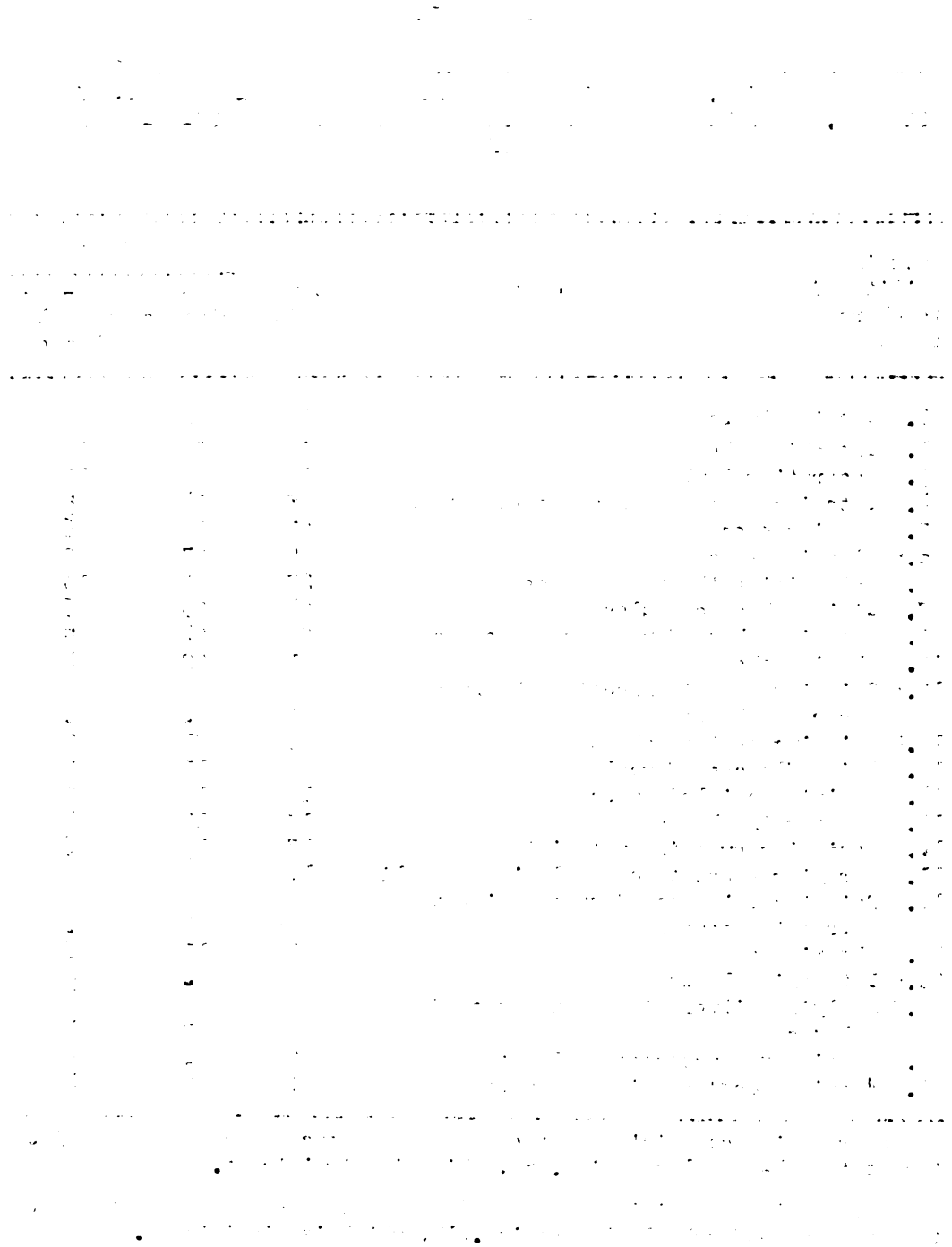
TABLE XIX

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANIPULATIVE JOBS IN THE SHEEP ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS TO OUT-OF-SCHOOL CLASSES

Rank in ability of teachers to do	Jobs	Could do	Taught to: All-day classes	Taught to: Out-of-school classes
1.5	Docking lambs	33	35	10
1.5	Drenching sheep	33	30	10
3.	Castrating lambs	30	30	10
4.	Catching sheep by an approved method	28	34	5
5.	Tagging ewes	27	30	6
6.5	Flushing ewes	25	27	9
6.5	Determining the age of sheep	25	29	10
8.	Giving sheep capsules	24	28	6
9.	Blocking sheep for shows and sales	22	24	5
10.5	Showing sheep	21	22	4
10.5	Clipping and disinfecting the navel cord of lambs	21	26	6
12.5	Trimming feet of sheep	20	21	5
12.5	Tying fleeces of wool	20	17	5
14.	Reviving chilled lambs	19	19	5
15.	Ear tagging lambs	18	17	4
16.	Assisting ewes in parturition	17	15	6
17.	Spraying sheep to control ticks and lice	16	28	9
18.	Painting briskets of rams during the breeding season	15	17	6
19.	Shearing sheep	13	17	6
20.5	Butchering lambs	5	6	5
20.5	Applying silver nitrate to eyes of lambs	5	7	4
22.	Cutting up carcasses of lambs	2	6	5
23.	"Sewing back" eyelids of lambs	1	5	4

The correlation coefficient between jobs the teachers could do and jobs taught to all-day classes is .959, which is significant.

The correlation coefficient between jobs the teachers could do and jobs taught to out-of-school classes is .615, which is significant.



Data in Table XX were used to calculate the correlation coefficient between the number of teachers who could do manipulative jobs in the swine enterprise and the number of teachers who taught these jobs to out-of-school classes; it was found to be .873, which is significant. The correlation coefficient between the number of teachers who could do these jobs and the number who taught these jobs to out-of-school classes was .789. These significant correlations indicate that manipulative jobs in the swine enterprise were taught very much according to the manipulative abilities of teachers in the enterprise. As shown in Table XX, 41 was the largest number of teachers who could do any manipulative job in the swine enterprise and ten was the smallest number of teachers who could do any manipulative job in this enterprise.

Correlations between manipulative abilities possessed and manipulative jobs taught in each enterprise were statistically significant. These significant correlations indicate that manipulative jobs are taught, primarily, according to manipulative abilities possessed in the enterprises, which would be expected.

However, by observing Tables XVIII, XIX, and XX, it can be seen in some instances that the number of teachers who reported they taught jobs was greater than the number of teachers who reported that they could do the same manipulative jobs. One reason for this difference might be that classroom teaching of the managerial aspects was

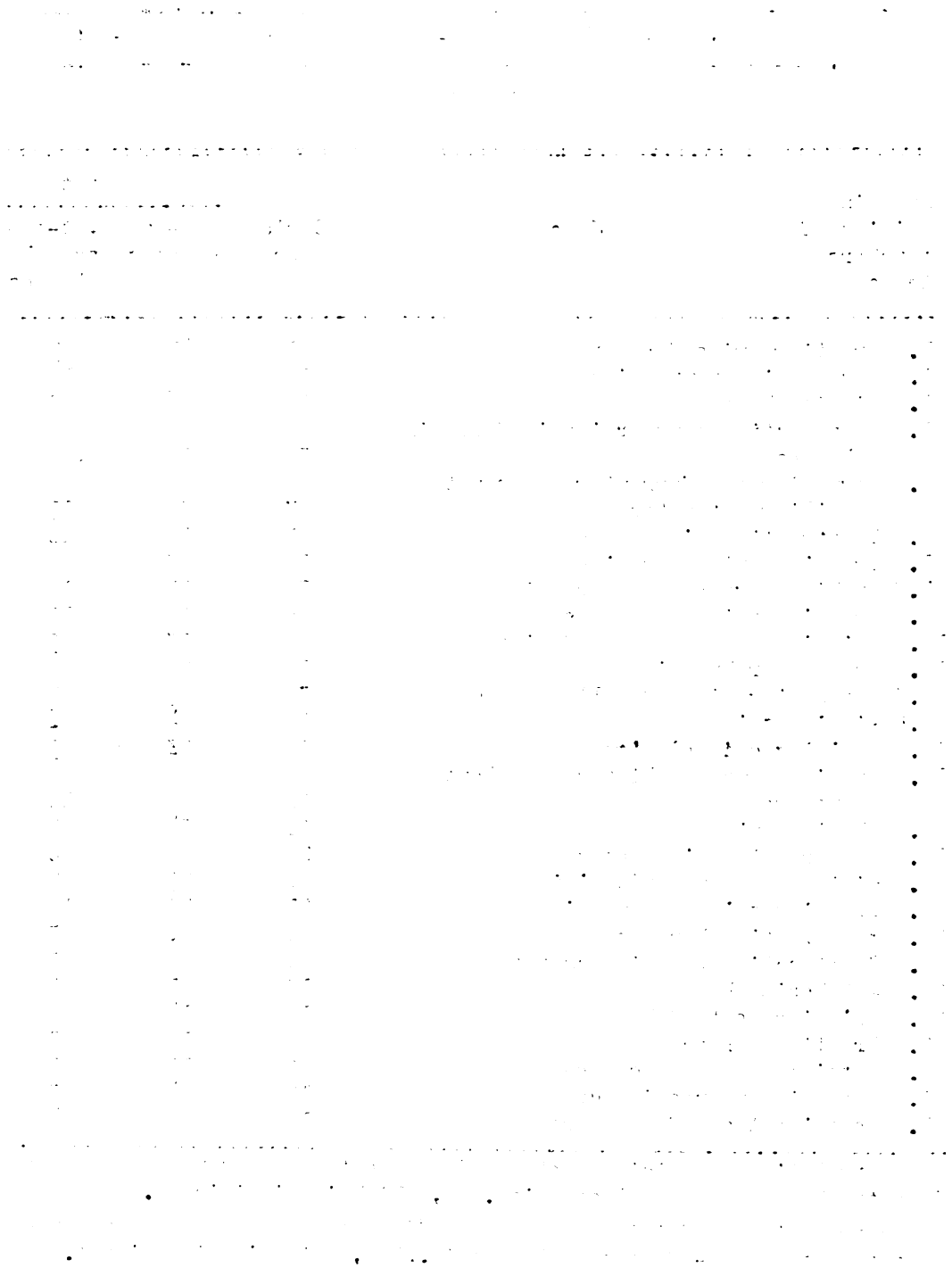
TABLE XX

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANIPULATIVE JOBS IN THE SWINE ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS TO OUT-OF-SCHOOL CLASSES

Rank in ability of teachers to do	Jobs	Could do	Taught to	
			All-day classes	Out-of-school classes
1.	Treating swine for worms	41	41	15
3.	Ear marking young pigs	39	40	12
3.	Ringing hogs	39	36	9
3.	Constructing guard rails in farrowing houses	39	39	14
5.5	Scrubbing the farrowing house with boiling hot water	37	39	17
5.5	Constructing pig brooders	37	39	10
7.5	Treating swine for lice	36	38	12
7.5	Washing sows before farrowing	36	37	15
9.	Treating swine for mange	35	35	13
10.	Clipping needle teeth of pigs	34	38	9
11.	Feeding orphan pigs	33	28	5
12.5	Castrating pigs by belly method	32	33	12
12.5	Fitting swine for show	32	34	6
15.	Reviving chilled pigs	30	28	3
15.	Hauling sows and litters to clean pasture	30	29	10
15.	Showing swine	30	34	5
17.	Constructing pig creeps	29	29	6
18.	Aiding a sow at parturition	28	29	5
19.	Treating swine for anemia	27	29	10
20.	Constructing hurdles	26	26	3
21.	Constructing breeding crates	20	16	3
22.	Butchering hogs	19	17	3
23.	Trimming feet of hogs	16	14	2
25.	Treating for scours	15	19	3
25.	Cutting up hog carcasses	15	13	3
25.	Operating a breeding crate	15	14	3
27.	Removing tusks from boars	10	9	4

The correlation coefficient between jobs the teachers could do and the jobs taught to all-day classes is .873, which is significant.

The correlation coefficient between the jobs teachers could do and the jobs taught to out-of-school classes is..789, which is significant.



considered when some manipulative jobs were reported as having been taught by teachers who reported that they could not perform the jobs. Also, a resource person, such as a local butcher, might have taught some manipulative jobs that teachers could not perform.

A significant correlation coefficient of .755, between managerial jobs that teachers could do and managerial jobs taught in the beef-cattle enterprise, was obtained from calculations of data in Table XXI. This correlation indicates that managerial jobs taught in the beef-cattle enterprise to all-day classes were mostly those that teachers could do.

An analysis of data in Table XXI resulted in a non-significant correlation coefficient of .124 between managerial jobs that teachers could do and managerial jobs that were taught in the beef-cattle enterprise to out-of-school classes. By a careful study of items in Table XXI, it can be seen that some of the jobs, that could be done by the largest number of teachers, were those that adult-farmers and young-farmers might be expected to be capable of doing because of farming experience.

Some of the managerial jobs that the greatest number of teachers could do, but that were the least frequently taught to out-of-school classes, were: providing adequate housing, feeding the cow and calf at calving time, caring for cows and heifers during gestation, caring for the cow and calf during lactation, and weaning beef calves.

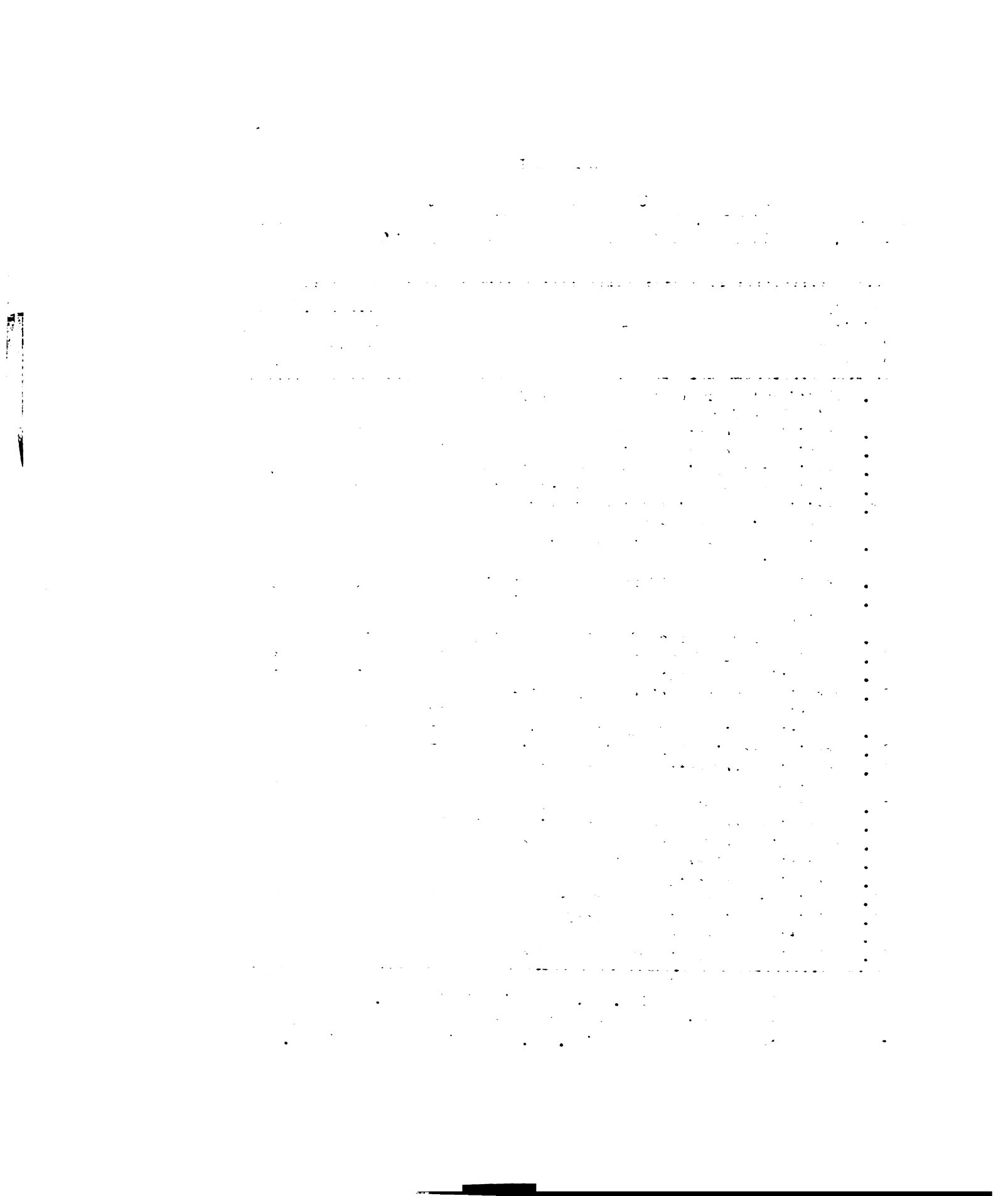
TABLE XXI

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANAGERIAL JOBS IN THE BEEF-CATTLE ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS OF OUT-OF-SCHOOL CLASSES

Rank in ability of teachers to do	Jobs	Could do	Taught to	
			All-day classes	Out-of-school classes
1.	Choosing the breed of beef-cattle for the home farm	44	42	13
2.	Providing adequate pasture	43	37	14
3.5	Providing adequate housing	42	36	9
3.5	Feeding the growing stock during winter	42	38	10
5.	Feeding the cow and calf at calving time	41	38	9
6.	Deciding the possibilities of beef production for the home farm	40	43	15
6.	Caring for cows and heifers during gestation	40	38	9
6.	Feeding cows and heifers during gestation	40	36	10
6.	Caring for the cow and calf at calving time	40	37	10
6.	Caring for cow and calf during lactation	40	34	9
11.5	Weaning the beef calves	39	31	8
11.5	Protecting beef cattle from parasites	39	37	11
13.	Breeding cows and heifers for spring calving	38	36	10
14.5	Selecting suitable foundation stock	37	36	9
14.5	Feeding breeding herd during the winter	37	32	9
16.5	Marketing beef cattle for economical returns	36	32	11
16.5	Feeding and caring for the herd bulls	36	29	9
18.5	Fattening beef cattle for economical gains	35	34	11
18.5	Protecting beef cattle from diseases	35	36	11
20.	Selecting replacement heifers	34	29	7
21.5	Preparing beef cattle for shows and sales	33	33	7
21.5	Keeping records of the beef herd	33	25	11
23.	Culling and improving the beef herd	30	26	11
24.	Marketing feeder calves	28	30	9
25.	Selecting feeder steers for the feed-lot	27	29	12

The correlation coefficient between the jobs teachers could do and jobs taught to all-day classes is .735, which is significant.

The correlation coefficient between jobs teachers could do and jobs taught to out-of-school classes is .124, which is not significant.



Some of the jobs in which teachers were the least proficient, but which were frequently taught to out-of-school classes, were those dealing with fattening beef cattle, marketing, selecting feeder cattle, keeping records, and improving the herd.

Table XXI shows that 44 was the largest number of teachers who were capable of doing any managerial jobs in the beef-cattle enterprise and 27 was the smallest number of teachers who were capable of doing any one of these jobs.

A significant correlation coefficient of .917, between managerial jobs that teachers could do and managerial jobs taught in the sheep enterprise to all-day classes, was obtained from an analysis of data in Table XXII. The analysis of these data also gave a significant correlation coefficient of .877 between these jobs that teachers could do and jobs taught to out-of-school classes. These high correlation coefficients indicate that managerial jobs in the sheep enterprise were taught, primarily, according to the managerial abilities in the enterprise possessed by the teachers. As shown in Table XXII, the largest number of teachers capable of doing any managerial job in the sheep enterprise was 43, and the smallest number capable of doing any one of these jobs was 24.

A non-significant correlation coefficient of .452 was obtained from the number of teachers who could do managerial jobs and the number who taught these jobs in the swine enterprise to all-day classes as shown in Table XXIII. As reported by the teachers, apparently a few

TABLE XXII

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANAGERIAL JOBS IN THE SHEEP ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS TO OUT-OF-SCHOOL CLASSES

Rank in ability of teachers to do	Jobs	Could do	Taught to	
			All-day classes	Out-of-school classes
2.	Deciding the possibilities of sheep production for the home farm	43	42	14
2.	Feeding pregnant ewes during winter	43	37	11
2.	Providing adequate housing for the flock during the winter	43	39	9
4.	Feeding ewes and lambs during lactation	42	39	9
5.5	Selecting the type and breed of sheep for the foundation stock	41	39	11
5.5	Breeding the ewes for the most satisfactory lambing period	41	37	13
7.5	Fattening lambs for the most economical gains	39	37	11
7.5	Controling diseases of sheep	39	39	13
9.	Controlling parasites of sheep	38	39	14
10.5	Selecting foundation stock for the breeding flock	37	35	10
10.5	Caring for the ewes and lambs at lambing time	37	37	11
12.5	Culling and improving the breeding flock	36	35	11
12.5	Selecting replacement ewe lambs for the breeding flock	36	36	11
14.5	Planning for sheep shearing time	35	31	11
14.5	Keeping records of the flock	35	31	10
16.	Marketing sheep for the most economical returns	31	27	9
17.	Preparing sheep for shows and sales	30	25	5
18.	Marketing wool for the most economical returns	29	29	6
19.	Improving the physical characteristics of young lambs	24	22	9

The correlation coefficient between the jobs the teachers could do and the jobs taught to all-day classes is .917, which is significant.

The correlation coefficient between the jobs the teachers could do and the jobs taught to out-of-school classes is .877, which is significant.

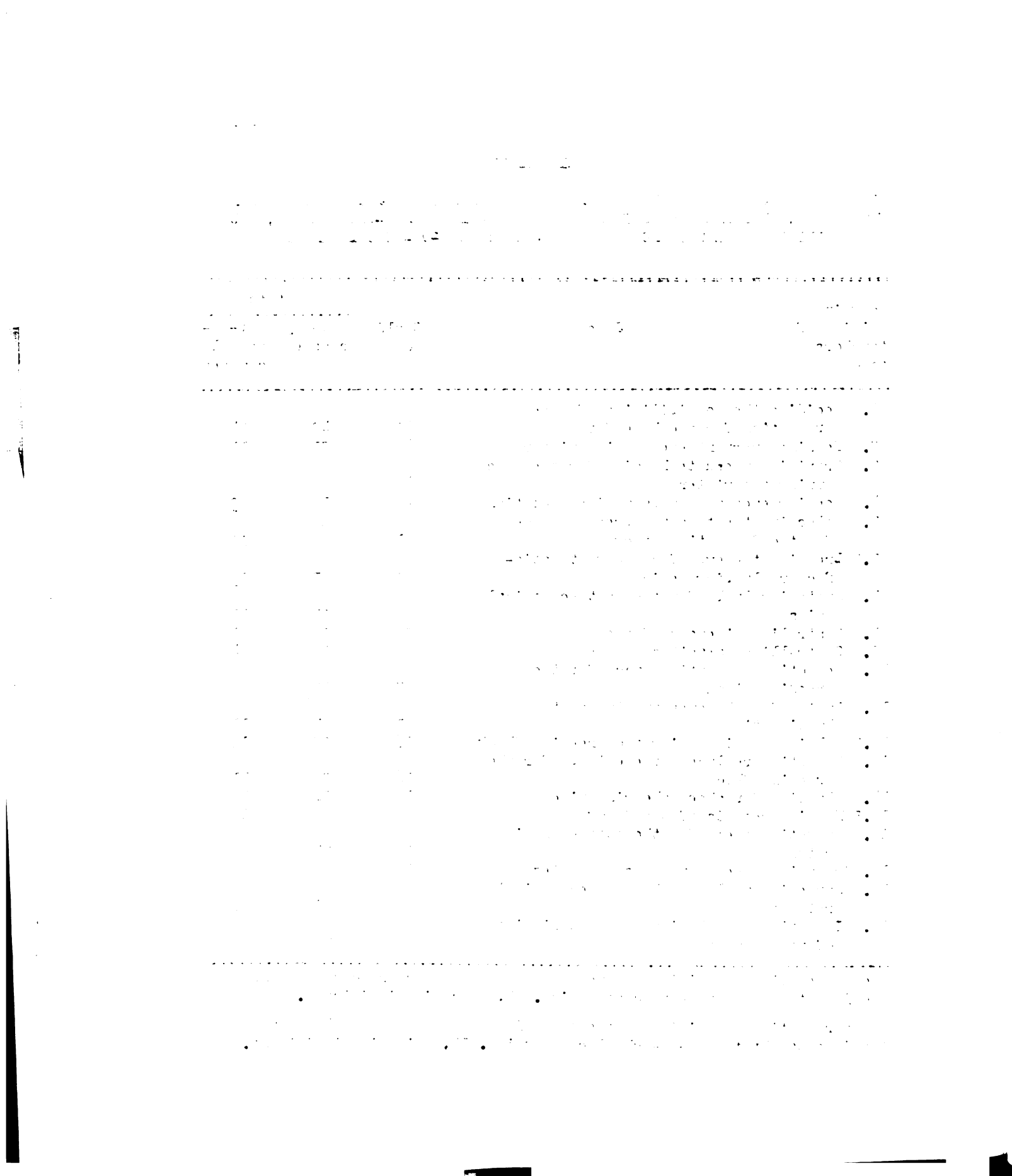


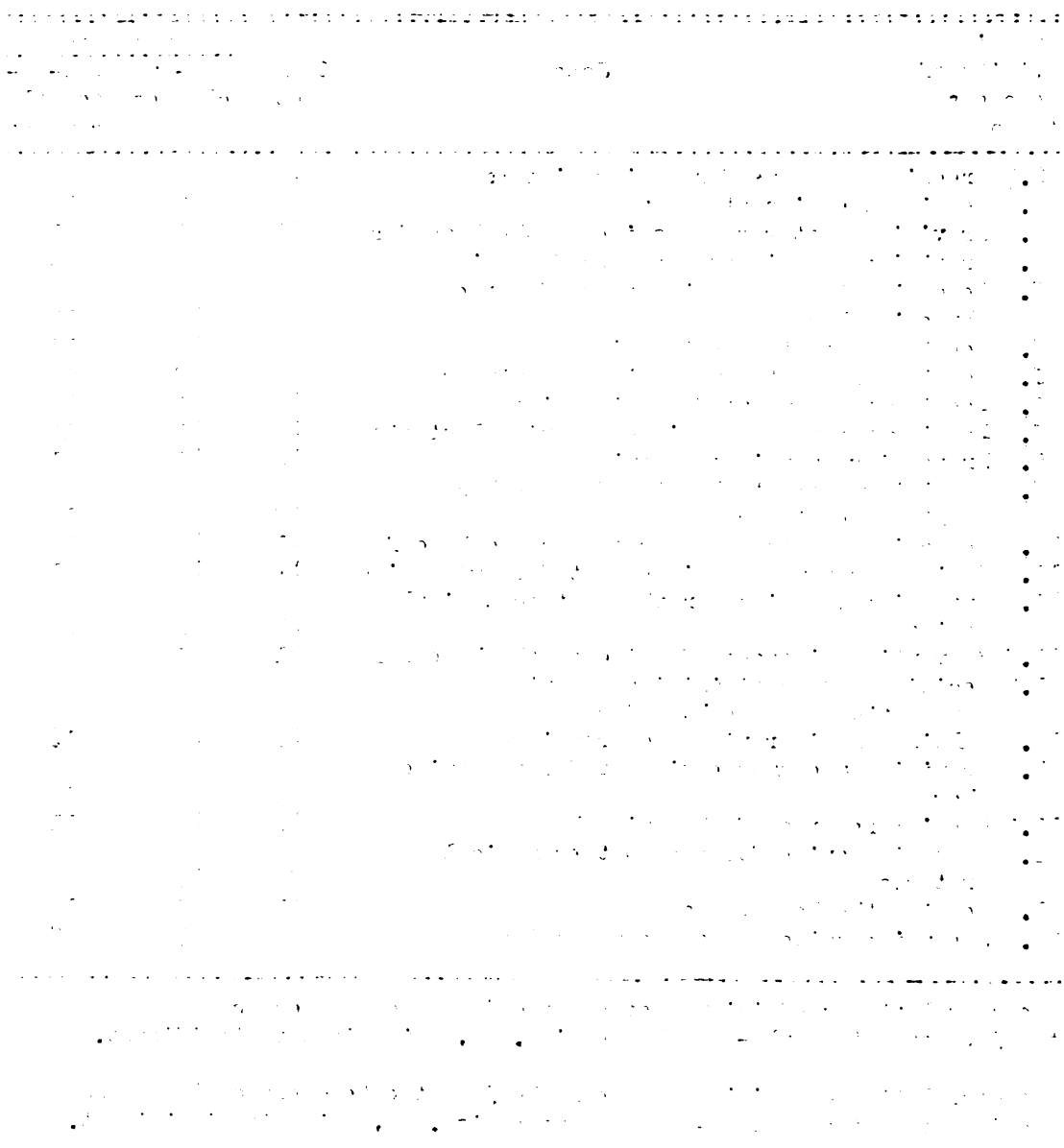
TABLE XXIII

NUMBER OF TEACHERS WHO COULD DO EACH OF THE MANAGERIAL JOBS IN THE SWINE ENTERPRISE, NUMBER WHO TAUGHT EACH OF THESE JOBS TO ALL-DAY CLASSES, AND NUMBER WHO TAUGHT EACH OF THESE JOBS TO OUT-OF-SCHOOL CLASSES

Rank in ability of teachers to do	Jobs	Could do	Taught to All-day classes	Taught to Out-of-school classes
2.5	Breeding the sows for spring litters	43	42	20
2.5	Weaning the pigs at 56 days	43	42	18
2.5	Providing pastures for swine on the home farm	43	43	21
2.5	Providing protein supplements for swine	43	43	20
5.	Selecting the foundation stock for the breeding herd	42	40	17
5.	Feeding sows at breeding time	42	43	19
5.	Feeding pregnant sows during the winter	42	42	19
5.	Feeding the sows at farrowing time	42	43	19
5.	Feeding the sows and litters during lactation	42	43	19
5.	Preventing parasites of swine	42	43	21
5.	Providing adequate housing for the herd during the winter	42	42	16
13.5	Selecting the type and breed for the home farm	41	43	15
13.5	Caring for sows and litters at farrowing time	41	42	21
13.5	Fattening the pigs for the most economical gains	41	42	20
13.5	Preventing diseases of swine on the home farm	41	43	20
17.5	Deciding the possibilities of swine production for the home farm	40	43	22
17.5	Culling and improving the breeding herd	40	43	16
17.5	Providing adequate equipment for the swine herd	40	42	14
17.5	Keeping records of the swine herd	40	40	11
20.	Marketing swine for the most economical returns	39	40	20
21.	Feeding the herd boars	37	33	12
22.	Preparing swine for shows and sales	35	37	8

The correlation coefficient between the jobs the teachers could do and the jobs taught to all-day classes is .452, which is not significant.

The correlation coefficient between the jobs the teachers could do and the jobs taught to out-of-school classes is .699, which is significant.



of them were attempting to teach a few managerial jobs in this enterprise that they indicated that they could not do. Table XXIII shows that the number of teachers who taught 13 jobs to all-day classes were slightly larger than the numbers of teachers who reported that they could do the same 13 jobs. Nine of these 13 jobs were in the lower one-half of the jobs, ranked according to the ability of teachers to do the jobs.

The correlation coefficient between managerial jobs that teachers could do and managerial jobs taught in the swine enterprise to out-of-school classes, as shown in Table XXIII, was significant at .699. This correlation indicates that managerial jobs taught in the swine enterprise to out-of-school classes were mostly determined by managerial abilities possessed by teachers in the enterprise. Table XXIII shows that four jobs could be done by 43 teachers and one managerial job in the swine enterprise could be done by 35 teachers.

Tables XVIII to XXIII show that some jobs common to two or three of the enterprises were in the lower one-half of the jobs ranked according to the ability of teachers to do the job. Some outstanding examples of these jobs were: "Butchering" and "Cutting up the Carcasses" in all enterprises; "Guarding the Health of Animals" in all enterprises; jobs concerning "Animal Breeding" in all enterprises; "Marketing" in the sheep and swine enter-

prises; "Feeding the Herd Sire" in the beef-cattle and swine enterprises; and "Fattening for Market" in the beef-cattle and swine enterprises. Most of these jobs in which the teachers were the weakest can be grouped into three areas of livestock production; meats, animal breeding, and marketing.

Summary

This chapter has presented comparisons between manipulative abilities and managerial abilities possessed by teachers in each livestock enterprise and comparisons between manipulative and managerial jobs taught in each enterprise. The results of these comparisons are reported in the following paragraphs.

There was a significant difference between manipulative abilities and managerial abilities that the teachers possessed in each livestock enterprise. In each of these enterprises the teachers possessed a much higher per cent of managerial abilities than of manipulative abilities. Also, a much larger per cent of managerial jobs than of manipulative jobs were taught in each enterprise to all-day classes.

Data pertaining to correlations between abilities possessed by teachers and jobs taught in each enterprise have been presented in this chapter.

The values of r between both manipulative and managerial abilities possessed and manipulative and managerial jobs taught in each livestock enterprise are summarized in Table XXIV.

TABLE XXIV

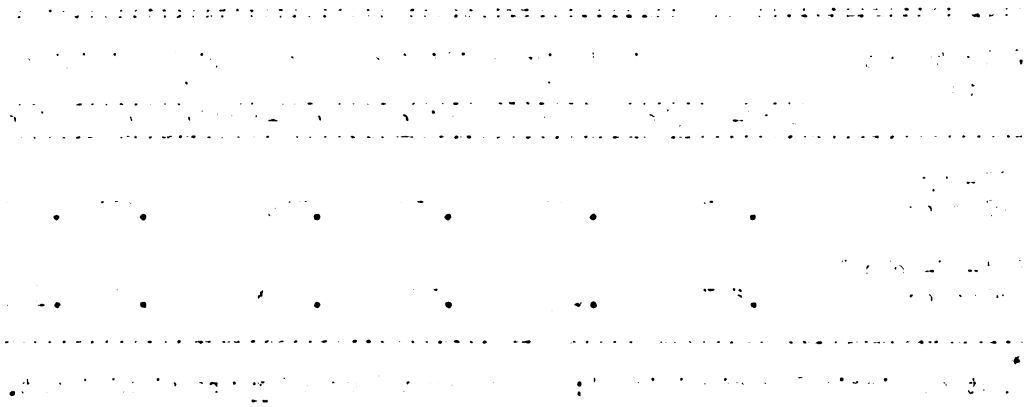
CORRELATIONS BETWEEN ABILITIES POSSESSED AND JOBS TAUGHT

Jobs taught to	Manipulative abilities in			Managerial abilities in		
	Beef-cattle	Sheep	Swine	Beef-cattle	Sheep	Swine
All-day classes	.967	.959	.873	.738	.917	.452*
Out-of-school classes	.837	.815	.789	.124*	.877	.699

* Not statistically significant; all other values of r are significant.

The significant correlations between abilities possessed and jobs taught, in ten of 12 instances, would indicate that there is a tendency for teachers of vocational agriculture to teach about the same jobs in livestock enterprises in which they possessed the abilities to perform. It might be expected that correlations between abilities possessed and jobs taught would be comparatively high.

On the basis of rank order of jobs according to the ability of teachers to do jobs, the teachers were the least capable of doing jobs in the meats, animal breeding, and marketing phases of livestock production. Teachers were the most capable of doing jobs in the general management, animal nutrition, selection of animals, and fitting and showing phases of livestock production.



The variation was much greater among manipulative jobs than among managerial jobs as to the number of teachers who possessed the abilities to do jobs in these livestock enterprises.

CHAPTER VII

COMPARISONS BETWEEN ABILITIES IN DIFFERENT ENTERPRISES POSSESSED BY TEACHERS AND COMPARISONS BETWEEN JOBS TAUGHT IN DIFFERENT ENTERPRISES TO ALL-DAY CLASSES

The importance of manipulative abilities and managerial abilities possessed by teachers of vocational agriculture were presented in chapter one. In determining the more important abilities in the livestock enterprises possessed by these teachers, this chapter will present the following comparisons: of manipulative abilities in beef-cattle, sheep, and swine enterprises possessed by teachers; of managerial abilities in these enterprises possessed by teachers; of manipulative jobs taught in these enterprises; and of managerial jobs taught in these enterprises. These comparisons should answer these and similar questions:

Did teachers possess more manipulative abilities in the beef-cattle enterprise than they possessed in the swine enterprise? In which of the livestock enterprises were teachers most capable of doing managerial jobs? Were more manipulative jobs taught in the swine enterprise than in the sheep enterprise? In which of these enterprises was the largest per cent of managerial jobs taught?

Comparisons between Abilities of Teachers in the Different Enterprises

This part of the chapter will present results of the study pertaining to manipulative abilities and managerial abilities in the enterprises that teachers possessed. Comparisons will be made between abilities possessed in the different livestock enterprises.

TABLE XXV

NUMBER OF TEACHERS BY PER CENT OF MANIPULATIVE ABILITIES POSSESSED IN EACH LIVESTOCK ENTERPRISE

Per cent of abilities	Number of teachers		
	Beef-cattle	Sheep	Swine
75-100	4	6	19
50-74	15	16	17
25-49	12	10	6
0-24	11	13	3
Totals	45	45	45

The difference between the per cent of manipulative abilities possessed in the beef-cattle and sheep enterprises is not significant.

The difference between the per cent of manipulative abilities possessed in the beef-cattle and swine enterprises is significant.

The difference between the per cent of manipulative abilities possessed in the sheep and swine enterprises is significant.

By observing Table XXV it can be seen that 22 teachers (or approximately 50 per cent) possessed 50 per cent or more of the manipu-

lative abilities in the beef-cattle and sheep enterprises and 36 teachers (or 50 per cent) possessed 50 per cent or more of these abilities in the swine enterprise. The difference in the per cent of abilities in the beef-cattle and sheep enterprises that teachers possessed was very small. The difference between the per cent of these abilities possessed by the teachers in the swine enterprise and the per cent of the abilities possessed in either of the other two enterprises was significantly large.

These differences in per cents indicate that teachers were much better qualified to do manipulative jobs in the swine enterprise than in the beef-cattle or sheep enterprise. The results indicate that they were about equally qualified to do manipulative jobs in the beef-cattle and sheep enterprises.

Table XXV shows that 19 teachers (or 42 per cent) could do 75 per cent or more of the manipulative jobs in the swine enterprise; six teachers (or approximately 13 per cent) and four teachers (or about nine per cent) could do 75 per cent or more of the manipulative jobs in the sheep and beef-cattle enterprises respectively. MacDonald[1] reported that nine of 38 teachers in Montana (or about 26 per cent) could do 75 per cent or more of the manipulative jobs in the swine

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[1] Donald A. MacDonald, "Some Needed Improvements in the Montana Vocational Agriculture Program," (unpublished Master's thesis, Montana State College, Bozeman, 1939) p. 22.

enterprise; 15 of 38 teachers (or approximately 39 per cent) could do 75 per cent or more of these jobs in the sheep enterprise; and 16 of 38 teachers (or about 42 per cent) could do 75 per cent or more of the manipulative jobs in the beef-cattle enterprise. The Montana teachers were much better qualified to do manipulative jobs in beef-cattle and sheep enterprises than were the Michigan teachers. However, the Michigan teachers were much better qualified to do manipulative jobs in the swine enterprise than were the Montana teachers. The importance of the three enterprises in the two states might account in part for the differences in the abilities of teachers in the two states.

The range of scores in manipulative abilities of teachers included in the present study were: swine, 0-88 per cent; sheep, 0-86 per cent; and beef-cattle, 0-81 per cent. Rhoad reported a range of scores of prospective teachers as follows: swine, 0-75 per cent; sheep, 0-75 per cent; and beef and dairy cattle, 12 to 84 per cent.[2] More farm experience of employed teachers included in the present study might have accounted for a higher upper limit of scores in the swine and sheep enterprises than were made by prospective teachers included in the study by Rhoad. The abilities in the cattle enterprise in the Rhoad study included both beef and dairy cattle. This

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[2]Claude E. Rhoad, "A Study of the Comprehensiveness of Abilities in Technical Agriculture Attained by Prospective Teachers of Vocational Agriculture in Ohio Previous to Their Entrance into Student Teaching," (unpublished Doctor's dissertation, Ohio State University, Columbus, 1943) p. 65.

might be partially responsible for the higher score made in this enterprise than was made by teachers in the present study.

The average scores in per cent made by teachers included in the present study were: swine, 65.6; beef-cattle, 44.1; and sheep, 42.2. Rhoad reported the average scores in per cent of trainees in manipulative abilities were: beef and dairy cattle, 41; swine, 35.5; and sheep, 22.[3] The rank of manipulative abilities of teachers in the present study by enterprises was: swine, beef-cattle, and sheep; however, the difference of abilities in the beef-cattle and sheep enterprises was very small. The rank of manipulative abilities of prospective teachers in the study by Rhoad was: beef and dairy cattle, swine and sheep; the difference of abilities in the beef and dairy cattle enterprise and swine enterprise was small.

In the study reported by Kirkland,[4] the rank of manipulative abilities by teachers by enterprises was swine, beef and dairy cattle, and sheep. This rank is similar to that found in the present study.

Results pertaining to the managerial abilities of teachers in the different enterprises are presented in Table XXVI.

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[3] Ibid., p. 65.

[4] James B. Kirkland, "A Study of the Professional and Technical Difficulties Encountered by Teachers During Their First Year of Teaching Vocational Agriculture," (unpublished Doctor's dissertation, Ohio State University, Columbus, 1947) p. 140.

TABLE XXVI

NUMBER OF TEACHERS BY PER CENT OF MANAGERIAL ABILITIES POSSESSED IN EACH LIVESTOCK ENTERPRISE

Per cent of abilities	Number of teachers		
	Beef-cattle	Sheep	Swine
74-100	38	32	41
50-74	5	8	1
25-49	2	4	1
0-24	0	1	2
Totals	45	45	45

The difference between the per cent of managerial abilities possessed in the beef-cattle and sheep enterprises is not significant.

The difference between the per cent of managerial abilities possessed in the beef-cattle and swine enterprises is not significant.

The difference between the per cent of managerial abilities possessed in the sheep and swine enterprises is significant.

In Table XXVI it can be seen that 43 teachers (or 96 per cent) possessed 50 per cent or more of the managerial abilities in the beef-cattle enterprise, and 40 teachers (or 89 per cent) possessed 50 per cent or more of these abilities in the sheep enterprise. This difference in per cent is comparatively small. Table XXVI also shows that 42 teachers (or 93 per cent) possessed 50 per cent or more of the managerial abilities in the swine enterprise. This

is a small difference in per cent of abilities possessed in the beef-cattle and swine enterprises. Table XXVI shows that 41 teachers (or 91 per cent) had 75 per cent or more of the managerial abilities in the swine enterprise, and 32 teachers (or 71 per cent) had 75 per cent or more of the managerial abilities in the sheep enterprise. This makes a large difference between the per cent of managerial abilities possessed in the sheep and swine enterprise.

It can be seen in Table XXVI that the number of teachers who possessed 75 per cent or more of the abilities in each enterprise is large. This skewed distribution of teachers in the upper 25 per cent is partially responsible for the lack of a significant difference between abilities possessed in the beef-cattle and sheep enterprises and between the beef-cattle and swine enterprises.

Comparisons between Jobs Taught in the Different Enterprises to All-day Classes

The last part of the chapter will present comparisons: between manipulative jobs taught in the beef-cattle and sheep enterprises, between these jobs taught in the beef-cattle and swine enterprises, and between these jobs taught in the sheep and swine enterprises. Similar comparisons will be presented for the managerial jobs taught in the enterprises.

TABLE XXVII

NUMBER OF TEACHERS BY PER CENT OF MANIPULATIVE JOBS TAUGHT IN EACH LIVESTOCK ENTERPRISE TO ALL-DAY CLASSES

Per cent of jobs	Number of teachers		
	Beef-cattle	Sheep	Swine
75-100	3	8	16
50-74	22	14	21
25-49	13	8	6
0-24	7	15	2
Totals	45	45	45

The difference between the per cent of manipulative jobs taught in the beef-cattle and sheep enterprises is not significant.

The difference between the per cent of manipulative jobs taught in the beef-cattle and swine enterprises is significant.

The differences between the per cent of manipulative jobs taught in the sheep and swine enterprises is significant.

In Table XXVII it can be seen that 25 teachers (or 56 per cent) taught 50 per cent or more of the manipulative jobs in the beef-cattle enterprise, and 22 teachers (or 50 per cent) taught 50 per cent or more of these jobs in the sheep enterprise. The difference between the per cent of jobs taught in these two enterprises is very small. Table XXVII also shows that 37 teachers (or 82 per cent) taught 50 per cent or more of the manipulative jobs in the swine

TABLE XXVII

NUMBER OF TEACHERS BY PER CENT OF MANIPULATIVE JOBS TAUGHT IN EACH LIVESTOCK ENTERPRISE TO ALL-DAY CLASSES

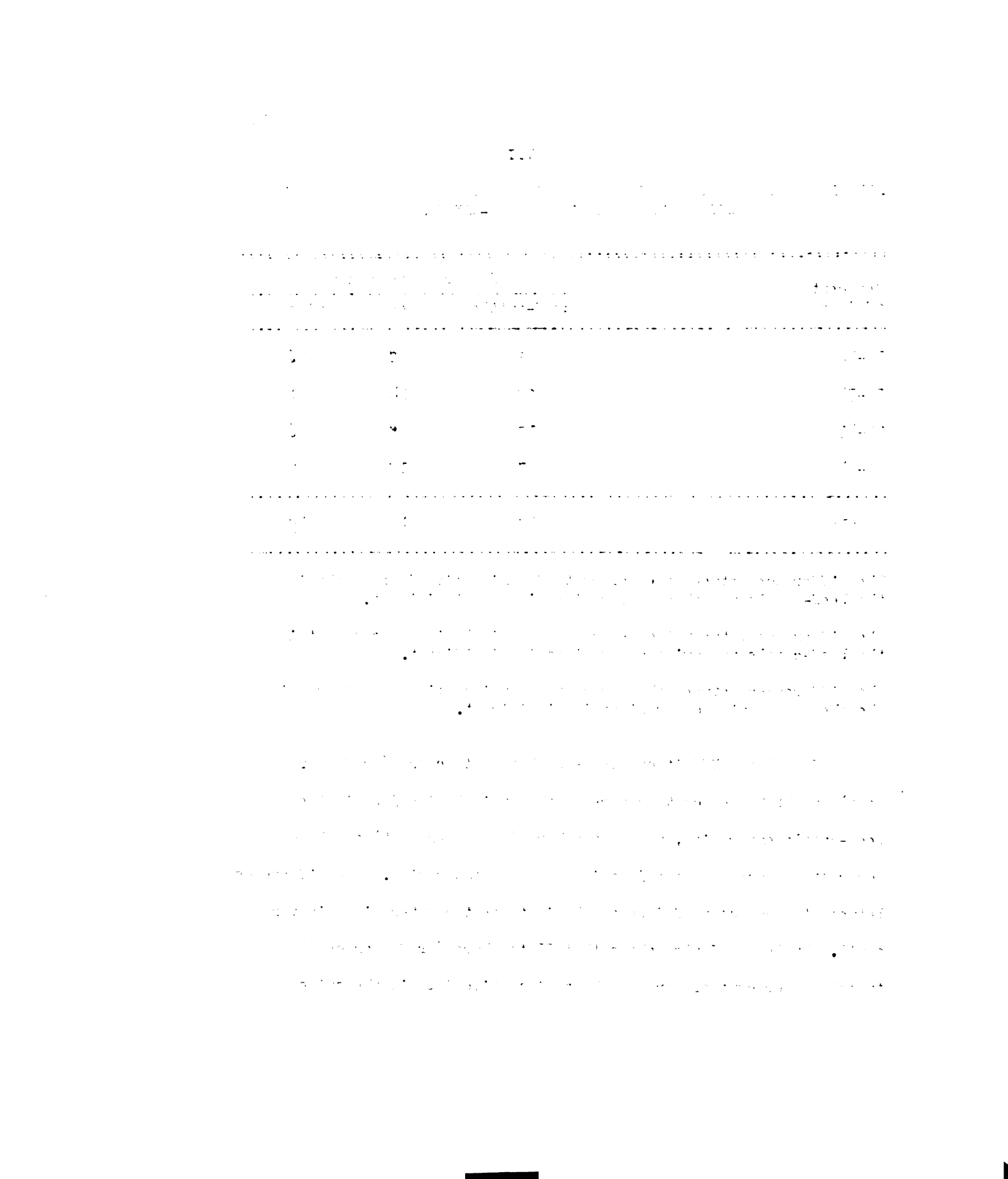
Per cent of jobs	Number of teachers		
	Beef-cattle	Sheep	Swine
75-100	3	8	16
50-74	22	14	21
25-49	13	8	6
0-24	7	15	2
Totals	45	45	45

The difference between the per cent of manipulative jobs taught in the beef-cattle and sheep enterprises is not significant.

The difference between the per cent of manipulative jobs taught in the beef-cattle and swine enterprises is significant.

The differences between the per cent of manipulative jobs taught in the sheep and swine enterprises is significant.

In Table XXVII it can be seen that 25 teachers (or 56 per cent) taught 50 per cent or more of the manipulative jobs in the beef-cattle enterprise, and 22 teachers (or 50 per cent) taught 50 per cent or more of these jobs in the sheep enterprise. The difference between the per cent of jobs taught in these two enterprises is very small. Table XXVII also shows that 37 teachers (or 82 per cent) taught 50 per cent or more of the manipulative jobs in the swine



enterprise. The difference between the per cent of jobs taught in the swine enterprise and the beef-cattle enterprise was very large. The difference in the per cent of manipulative jobs taught in the swine enterprise and sheep enterprise was large. A much larger per cent of manipulative jobs was taught in the swine enterprise than in either the beef-cattle or sheep enterprises.

The rank of manipulative jobs taught by enterprises in this study was as follows: swine, beef-cattle, and sheep. Harper[5] reported the rank of manipulative jobs taught by enterprises to be: swine, beef and dairy cattle, and sheep. Harper's findings were similar to those of the present study except that manipulative jobs in dairy cattle were included with jobs in beef-cattle which was not the case in the present study.

Comparisons of managerial jobs taught in the different enterprises to all-day classes are presented in Table XXVIII.

Table XXVIII shows that 35 teachers (or 77 per cent) taught 50 per cent or more of the managerial jobs in the beef-cattle enterprise; 37 teachers (or 82 per cent) taught 50 per cent or more of these jobs in the sheep enterprises. The difference between the per cent of managerial jobs taught in the beef-cattle and sheep enterprises was very small. Table XXVIII shows that 43 teachers (or 96 per cent) taught 50 per cent or more of these jobs in the swine enterprise. The difference between the per cent of jobs

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[5]Jack-London Harper, "Operative Skills Essential to the Teachers of Vocational Agriculture in the State of Louisiana", (unpublished Master's thesis, Louisiana State University, Baton Rouge, 1948) p. 42.

TABLE XXVIII

NUMBER OF TEACHERS BY PER CENT OF MANAGERIAL JOBS TAUGHT IN EACH LIVESTOCK ENTERPRISE TO ALL-DAY CLASSES

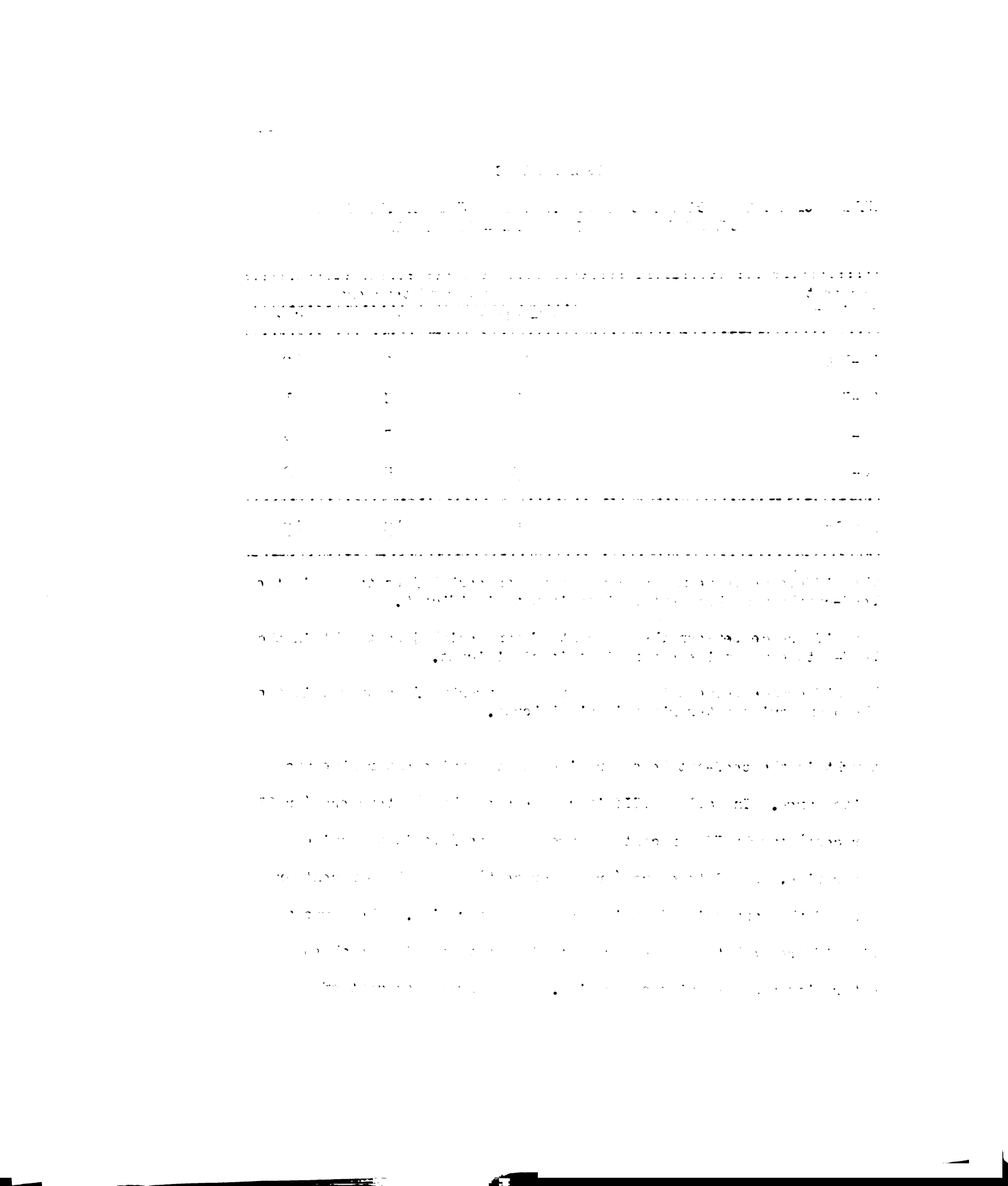
Per cent of jobs	Number of teachers		
	Beef-cattle	Sheep	Swine
75-100	30	29	42
50-74	5	8	1
25-49	5	3	0
0-24	5	5	2
Totals	45	45	45

The difference between the per cent of managerial jobs taught in the beef-cattle and sheep enterprises is not significant.

The difference between the per cent of managerial jobs taught in the beef-cattle and swine enterprises is significant.

The difference between the per cent of managerial jobs taught in the sheep and swine enterprises is significant.

taught in the beef-cattle enterprise and the swine enterprise was quite large. In Table XXVIII it can be seen that 42 teachers (or 93 per cent) taught 75 per cent or more of these jobs in the swine enterprise, and 29 teachers (or 65 per cent) taught 75 per cent or more of the managerial jobs in the sheep enterprise. There was a big difference between the per cent of jobs taught in the sheep enterprise and the swine enterprise. The largest per cent of



managerial jobs taught was in the swine enterprise, the next largest per cent was in the sheep enterprise, and the least per cent of these jobs taught was in the beef-cattle enterprise.

Summary

This chapter has presented results of the study regarding the comparative abilities in the livestock enterprises possessed by teachers and comparisons of jobs taught in these enterprises to all-day classes.

The significant results pertaining to manipulative abilities possessed by the teachers are: a much higher per cent was possessed in the swine enterprise than in either the beef-cattle or sheep enterprises.

There was only one significant finding pertaining to the managerial abilities possessed by teachers: a much greater per cent of these abilities was possessed in the swine enterprise than in the sheep enterprise.

A significantly greater per cent of manipulative jobs was taught in the swine enterprise than in either the beef-cattle or sheep enterprise.

The per cent of managerial jobs taught in the swine enterprise was much larger than the per cent of these jobs taught in either the sheep or beef-cattle enterprises.

CHAPTER VIII

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FURTHER STUDY

The problem in this study was to determine if certain factors are associated with the more important abilities possessed and the more important jobs taught in the beef-cattle, sheep, and swine enterprises by teachers of vocational agriculture. A list of these abilities and jobs was validated by a jury of ten members of the staffs in agricultural education and animal husbandry at Michigan State College. Chapters four, five, six, and seven present data, analysis of data, and interpretation of data in the present study regarding these abilities and jobs as reported by 45 fully-qualified teachers of vocational agriculture in Michigan during 1949-50.

The analysis of data includes comparisons of manipulative abilities possessed between teachers who were grouped according to: (1) number of credits in animal husbandry possessed by teachers, (2) number of years of experience as teachers of vocational agriculture, and (3) importance of livestock production in counties where teachers were located. Similar comparisons were made for managerial abilities possessed, and for both manipulative and managerial jobs taught to all-day and out-of-school classes.

Comparisons were made between manipulative abilities and managerial abilities possessed, and between manipulative jobs and

managerial jobs taught in each of these livestock enterprises. Correlations were determined by calculating the correlation coefficients between both manipulative and managerial abilities possessed by teachers and manipulative and managerial jobs taught to all-day and out-of-school classes in all three livestock enterprises. Comparisons were made: of manipulative abilities among the beef-cattle, sheep, and swine enterprises possessed by teachers; of managerial abilities possessed among these enterprises; of manipulative jobs taught among these enterprises; and of managerial jobs taught among these enterprises.

The chi-square technique was used to determine the significance of the difference between groups compared; the readings were made at the five per cent level on a table of chi-square. The significance of correlation coefficients was determined by readings at the one per cent level and with N - 2 degrees of freedom on a table of values of r.

This chapter will: (1) summarize the important findings, (2) list the major conclusions, (3) describe the implications of the study, and (4) make suggestions for further study.

Summary

Conforming to the specific purposes of the study as stated in chapter one, the following summary statements are made on the basis of analysis of data in the study.

(1) From less than 25 per cent to more than 75 per cent of the more important manipulative abilities and managerial abilities in the beef-cattle, sheep, and swine enterprises were possessed by the teachers of vocational agriculture.

(2) From less than 25 to more than 75 per cent of the more important manipulative jobs and managerial jobs were taught in each livestock enterprise to all-day classes and out-of-school classes by teachers in the study.

(3) a. Teachers with 12 or more credits in animal husbandry (majors) possessed a significantly higher percentage of manipulative abilities in beef-cattle and swine enterprises than did teachers with less than 12 credits (non-majors). In the sheep enterprise, the difference in the percentage of manipulative abilities possessed by the two groups of teachers was not significant.

b. The majors possessed a significantly greater percentage of managerial abilities in the beef-cattle enterprise than did the non-majors. The difference in the percentage of managerial abilities possessed by the two groups of teachers in the sheep enterprise and swine enterprise was not significant.

(4) There was no significant difference between majors and non-majors in percentage of manipulative jobs or in percentage of managerial jobs taught in each enterprise to all-day classes.

(5) There was no significant difference in percentage of manipulative abilities and managerial abilities possessed in each enterprise between teachers who had taught nine or more years (more-experienced teachers) and teachers who had taught less than nine years (less-experienced teachers).

(6) The difference was not significant between the percentage of manipulative jobs or the percentage of managerial jobs taught in each enterprise by more-experienced and less-experienced teachers to all-day classes.

(7) There was no significant difference between teachers in more-important counties and teachers in less-important counties of livestock production in percentage of manipulative abilities or in percentage of managerial abilities possessed in each enterprise.

(8) The difference in percentage of manipulative jobs or percentage of managerial jobs taught in each enterprise by these two groups of teachers was not significant.

(9) The teachers possessed a significantly higher percentage of managerial abilities than of manipulative abilities in each enterprise.

(10) A significantly greater percentage of managerial jobs than of manipulative jobs was taught in each livestock enterprise.

(11) a. Correlations were significant between the numbers of manipulative abilities possessed and manipulative jobs taught in all three livestock enterprises to all-day classes and to out-of school classes.

b. Significant correlations were found between managerial abilities of teachers and managerial jobs taught in the beef-cattle enterprise and in the sheep enterprise to all-day classes. However, the correlation was not significant between managerial abilities possessed and managerial jobs taught in the swine enterprise to all-day classes. This non-significant correlation is due to the fact that the number of teachers who could do each job was very nearly the same as the number who taught each corresponding job.

c. The correlation was not significant between managerial abilities possessed and managerial jobs taught in the beef-cattle enterprise to out-of-school classes. This correlation was significant in the sheep enterprise and in the swine enterprise.

d. The largest number of teachers who could do a manipulative job was 41, and the largest number who could do a managerial job was 44. The smallest number who could do a manipulative job was one, and the smallest number who could do a managerial job was 24.

(12) a. The teachers possessed a significantly greater percentage of manipulative abilities in the swine enterprise than in either beef-cattle or sheep enterprises. There was a very small difference in percentage of manipulative abilities possessed in the beef-cattle and sheep enterprises. The rank, by enterprises, of manipulative abilities possessed was: swine, beef-cattle, and sheep.

b. There was only one significant difference in percentage of managerial abilities possessed among the enterprises. The teachers possessed a significantly greater percentage of these abilities in the

swine enterprise than in the sheep enterprise. The rank, by enterprises, of managerial abilities possessed was: swine, beef-cattle, and sheep.

(13) a. A significantly higher percentage of manipulative jobs was taught in the swine enterprise to all-day classes than in either the beef-cattle or sheep enterprise. The rank, by enterprises, of manipulative jobs taught was: swine, beef-cattle, and sheep.

b. A significantly greater percentage of managerial jobs was taught in the swine enterprise than in either the beef-cattle or sheep enterprise. The rank, by enterprises, of managerial jobs taught to all-day classes was: swine, sheep, and beef-cattle.

c. There was no significant difference in any comparisons made between groups of teachers who taught out-of-school classes.

Conclusions

The present study was limited to teachers of vocational agriculture who had graduated from Michigan State College between 1937 and 1946; who had completed 15 credits at Michigan State College since graduation; who had taught between four and 13 years; and who were teaching in Michigan during 1949-50. If applications of findings and conclusions are made to other situations, these limitations should be considered. Curricula in agricultural education vary in different states. The curriculum in agricultural education at Michigan State

College before these teachers graduated was different from the one which was in effect when they graduated. Teachers with less than four years or more than 13 years of experience might vary in abilities possessed and jobs taught when compared with teachers included in the present study.

The following conclusions, which apply to groups instead of individual teachers, are based on findings in the study which involved 45 fully-qualified teachers in Michigan as described in the previous paragraph.

(1) There is a wide variation among teachers regarding the percentage of listed abilities possessed in beef-cattle, sheep, and swine enterprises.

(2) Teachers vary greatly in the percentage of a given list of jobs taught in these livestock enterprises.

(3) a. Number of credits in animal husbandry earned by teachers is associated with manipulative abilities possessed in beef-cattle and swine enterprises. From this association it may be expected that teachers with 12 or more credits, similar to these received by these teachers at Michigan State College, will possess more manipulative abilities in each of these two enterprises than will be possessed by teachers with less than 12 credits in animal husbandry. If teachers with similar training vary in manipulative abilities in the sheep enterprise, it is reasonable to expect that in the livestock enterprises.

the variation will not be due to number of credits possessed in animal husbandry.

b. Number of credits in animal husbandry. earned by teachers is associated with managerial abilities possessed in the beef-cattle enterprise only; thus teachers with 12 or more credits may be expected to possess more managerial abilities in this enterprise than are possessed by teachers with less than 12 credits.

(4) Number of credits earned in animal husbandry is not associated with jobs taught in these livestock enterprises. If teachers vary in either manipulative or managerial jobs taught in these enterprises, it may be expected that the variation will not be due to number of credits possessed in animal husbandry.

(5) Number of years of teaching in vocational agriculture is not associated with abilities possessed in these enterprises. If there is a variation among teachers in abilities possessed in the livestock enterprises, it may be expected that the variation will not be due to number of years of teaching vocational agriculture.

(6) Number of years of teaching is not associated with jobs taught in these enterprises. If there is a difference among teachers in jobs taught in these enterprises, it may be expected that the difference will not be due to number of years of teaching.

(7) Importance of livestock production in counties where teachers are located is not associated with possession of abilities

If there is a difference among teachers in abilities possessed in these enterprises, it is reasonable to expect that the difference will not be due to importance of livestock production in counties where teachers are located.

(8) Importance of livestock production in counties where teachers are located is not associated with jobs taught in these enterprises. If teachers vary in jobs taught in these enterprises, it may be expected that the variation will not be due to importance of livestock production in counties where teachers are located.

(9) There is a difference between proportions of manipulative and managerial abilities possessed by teachers. Teachers with training like that received by these at Michigan State College may be expected to possess a greater percentage of managerial abilities than of manipulative abilities in all three livestock enterprises.

(10) There is a difference between proportions of manipulative and managerial jobs taught in the enterprises. It may be expected that a greater percentage of managerial jobs than of manipulative jobs will be taught by teachers of vocational agriculture in all of these enterprises.

(11) a. It may be expected that teachers who possess more manipulative abilities will teach more manipulative jobs, and teachers who possess fewer manipulative abilities will teach fewer manipulative jobs in the livestock enterprises to both all-day and out-of-school classes.

b. It is reasonable to expect that managerial jobs taught in the beef-cattle and sheep enterprises to all-day classes will be largely determined by managerial abilities possessed by teachers in these enterprises. Managerial abilities possessed by teachers will not be the sole determining factor in managerial jobs taught in the swine enterprise to all-day classes.

c. It may be expected that managerial abilities possessed by teachers will determine to some extent the managerial jobs taught in the sheep and swine enterprises to out-of-school classes. Managerial jobs taught in the beef-cattle enterprise to out-of-school classes will be determined to a very small extent by managerial abilities possessed by teachers.

d. It may be expected that a wider variation will exist among manipulative jobs than among managerial jobs as to the number of teachers who possess abilities to do jobs in these livestock enterprises.

(12) There is a difference in proportions of abilities among these enterprises possessed by teachers. Teachers with training similar to that received at Michigan State College may be expected to possess a much greater percentage of manipulative abilities in the swine enterprise than in either the beef-cattle or sheep enterprise. They may possess a much larger percentage of managerial abilities in the swine enterprise than in the sheep enterprise.

(13) There is a difference in proportions of jobs taught among the livestock enterprises to all-day classes. It may be expected that a much higher percentage of both manipulative and managerial jobs will be taught in the swine enterprise than in either the beef-cattle or sheep enterprise.

Implications

This part of the chapter will present implications of the study which might aid in: selection of students for prospective teachers; pre-service education; in-service education; and placement of teachers of vocational agriculture. These implications are made on the basis of the findings and conclusions in the study.

Selection of students for prospective teachers. Probably greater consideration should be given to selection of students for prospective teachers who possess more abilities in the livestock enterprises prior to enrollment; or to students who give indications that they might acquire some of these essential abilities by securing additional farm experience prior to becoming employed teachers. This applies especially to the sheep and swine enterprises. To aid students in making a more efficient analysis of abilities possessed in these enterprises might necessitate a partial revision of the section of the farm experience inventory dealing with the livestock enterprises. This might be done partially on the basis of the more important abilities included in the check-list in the present study.

Pre-service education of teachers. a. Perhaps prospective teachers of vocational agriculture should be encouraged to take 12 or more credits in animal husbandry to acquire more manipulative abilities and managerial abilities in the beef-cattle enterprise and more manipulative abilities in the swine enterprise, if they are to be able to teach the essential jobs in these enterprises.

b. Possibly some consideration should be given to reorganizing the introductory courses in animal husbandry for students who find it impossible to take extra courses or who will not take extra courses in animal husbandry. Perhaps these reorganized courses should be general rather than specialized; they should cover beef-cattle, sheep, and swine enterprises with possibly a big increase in the amount of instruction in the sheep enterprise and some increase in the amount of instruction in the beef-cattle enterprise. This might necessitate the offering of a special section in the required courses for majors in agricultural education.

c. It might be that in some of the courses in agricultural education, still greater emphasis should be placed on the necessity of teachers using their manipulative abilities, and also the importance of teaching manipulative jobs to students of vocational agriculture. However, there is a possibility that more of these abilities may have been used and more of these jobs may have been taught in the individualized farm instruction in connection with the supervised farming programs of students, than were reported by the teachers included in the present study.

d. If possible, consideration might be given to including courses covering the animal breeding, meats, and marketing phases of livestock production in the pre-service education programs for prospective teachers of vocational agriculture. Seemingly, teachers are fairly well qualified in the general management, animal nutrition, selection, fitting, and showing phases of livestock production.

In-service education of teachers. a. Probably in graduate courses in agricultural education, continued emphasis should be made of the value of employed teachers making use of their abilities and also the importance of teaching the "doing" jobs.

b. As indicated in chapter one, the demand for a course in animal industry skills offered during the three weeks summer session at Michigan State College is indicative of its being one satisfactory method of acquiring some of the more important abilities in the livestock enterprises. However, this course does not carry graduate credit.

c. There might be a need for an increased number of in-service-education meetings on animal husbandry whereby teachers would have an opportunity to acquire some of the more important abilities in these enterprises.

Some teachers of vocational agriculture do not attend college after receiving a permanent certificate or a master's degree; the in-service meetings should be of special benefit to these teachers.

d. Another method of meeting these needs is to continue, and perhaps in some instances, to increase the time allocated during the annual conference for teachers of vocational agriculture for special sessions dealing with the livestock enterprises.

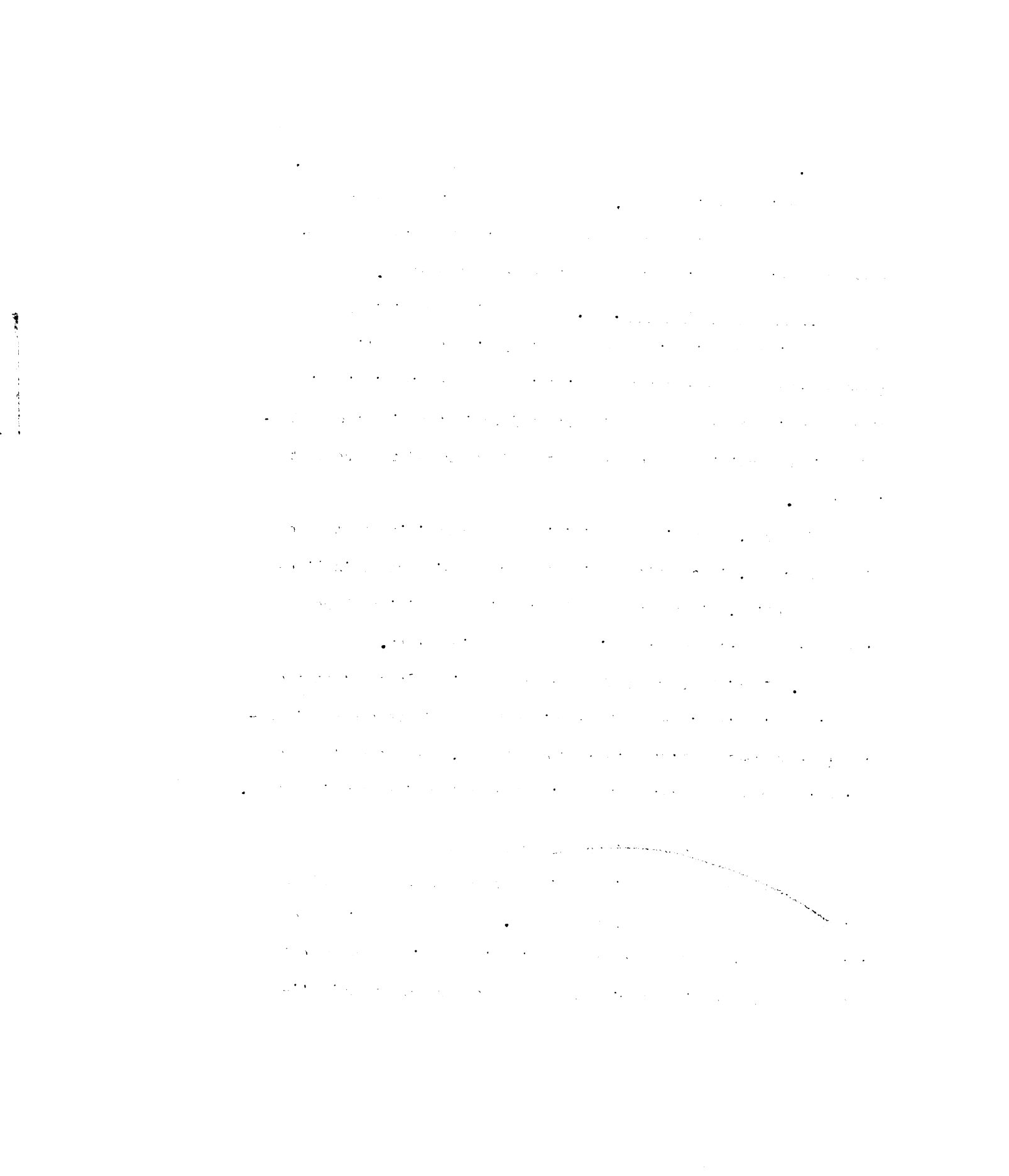
Placement of teachers. a. Perhaps local administrators should continue to give increased consideration to selection of teachers who possess sufficient abilities and who give indications that they will teach the more important jobs in the livestock enterprises in communities where these enterprises are of the greatest importance.

However, there is a possibility and probability that some of the teachers, in counties designated as less-important in livestock production, might have been located in communities where livestock production was very important and vice versa.

b. It might be that those concerned with placement at the educational institutions should continue to give increased consideration to technical qualifications of candidates, when asked to make nominations for communities where livestock enterprises are important.

Suggestions for Further Study

There are some questions which have confronted the writer during the progress of the present study. Would the findings be similar to those of the present study if like studies were made in other areas of technical agriculture such as farm crops or horti-



culture? The results of such studies would help to determine if the findings in the present study were peculiar to livestock enterprises only and not applicable to other areas of technical agriculture. Also, if such studies were made, the results should be of value in formulating or revising a curriculum in agricultural education, and in organizing and presenting both pre-service and in-service instruction in technical areas other than animal husbandry.

What is the relationship between grades made in courses in animal husbandry by teachers of vocational agriculture and their abilities in the livestock enterprises or jobs taught in these enterprises? The results of such a study should be of some value in considering grades as a factor in selecting a teacher for vocational agriculture, especially a first-year teacher.

Is there an association between specific courses taken in animal husbandry (or other technical areas) by teachers of vocational agriculture and abilities possessed or jobs taught in animal husbandry (or other technical areas)? There might be a tendency for students, who were raised on livestock farms, to take courses in animal husbandry primarily. Possibly this is as it should be but it might be of greater value for prospective and employed teachers to take courses dealing with other technical areas in which the teachers were lacking in abilities. The results of such a study could be helpful in guiding students in course selection, and also

in partially determining courses to include in a curriculum in agricultural education.

What is the association between abilities possessed in a specific livestock enterprise and the farm experience of students from farms devoted primarily to the same enterprise? Or, what is the association between abilities possessed in a technical area of agriculture and the farm experience of students from farms devoted primarily to the same technical area such as horticulture? Such studies could be helpful in guiding students in course selection. These studies would need to be made before the students took any collegiate courses in the enterprise or technical area involved.

Are teachers of vocational agriculture, who have taken graduate courses in animal husbandry, better qualified in this technical area than teachers who have taken undergraduate courses only? It might be that courses taken when teachers were graduate students would be of greater value in developing abilities in livestock enterprises than courses taken when teachers were undergraduate students. Results of such a study could be helpful in guiding teachers in course selection when they are working for a permanent certificate or an advanced degree.

Do teachers, who have participated in most of the in-service-education meetings on livestock production that have been held during a designated period of time, possess more abilities in

livestock enterprises than do teachers who have not participated in such meetings? The results of such a study might aid in an evaluation of the in-service instruction in animal husbandry. This evaluation might be a factor for teacher-educators to consider in deciding whether to broaden or narrow this phase of the program in agricultural education. Also, this evaluation could be a factor for teachers to consider in deciding whether to participate in such meetings.

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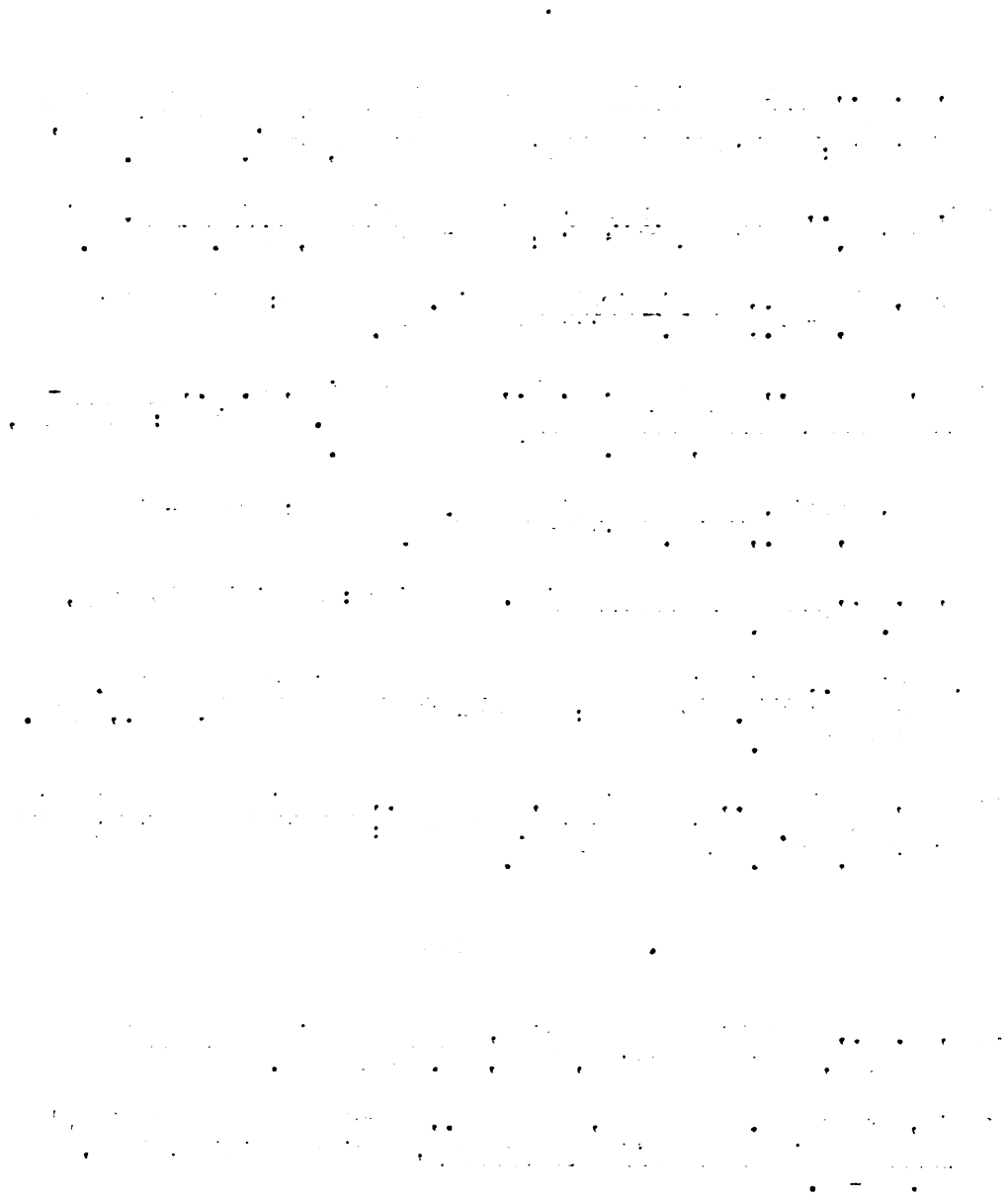

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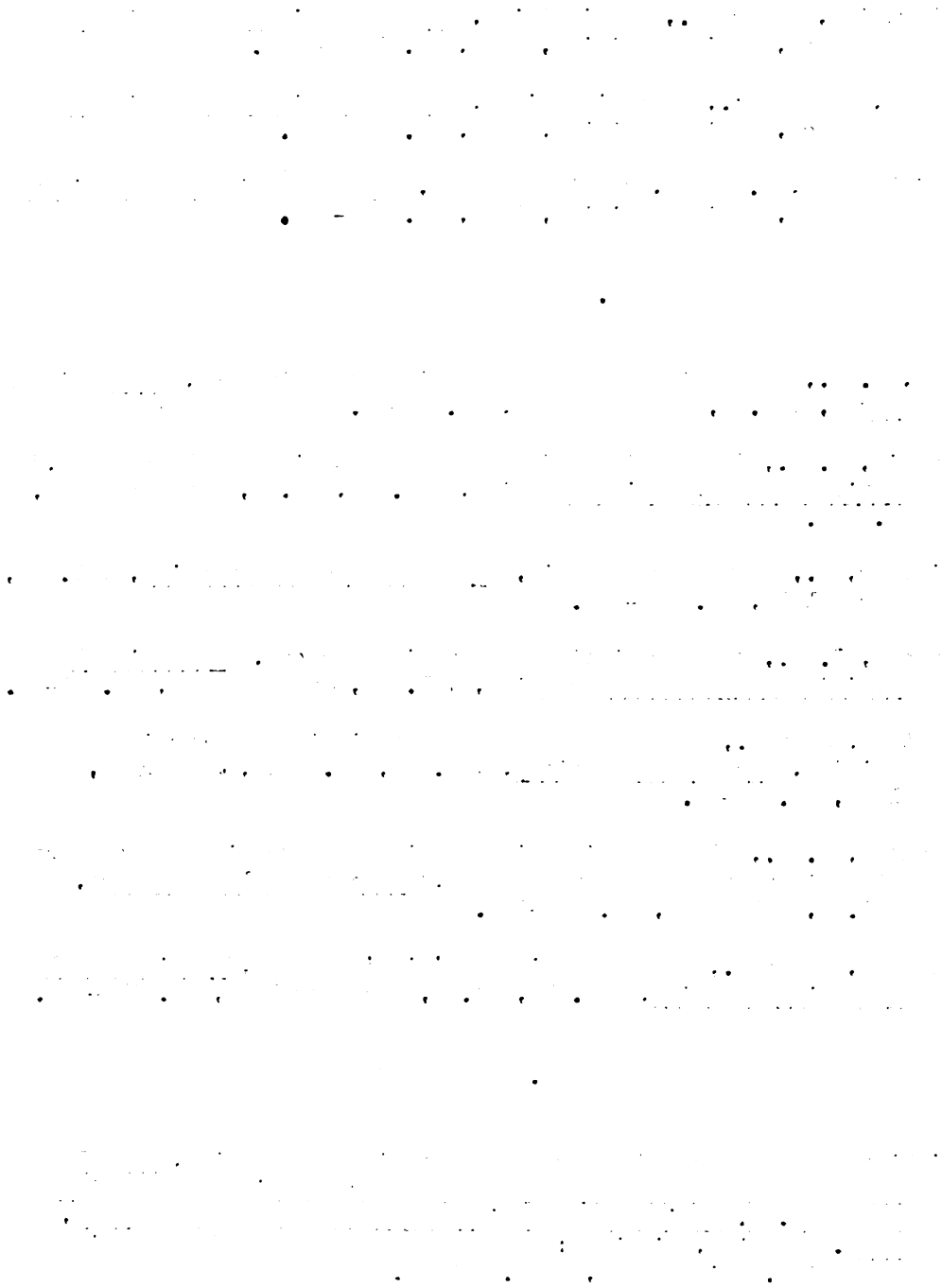

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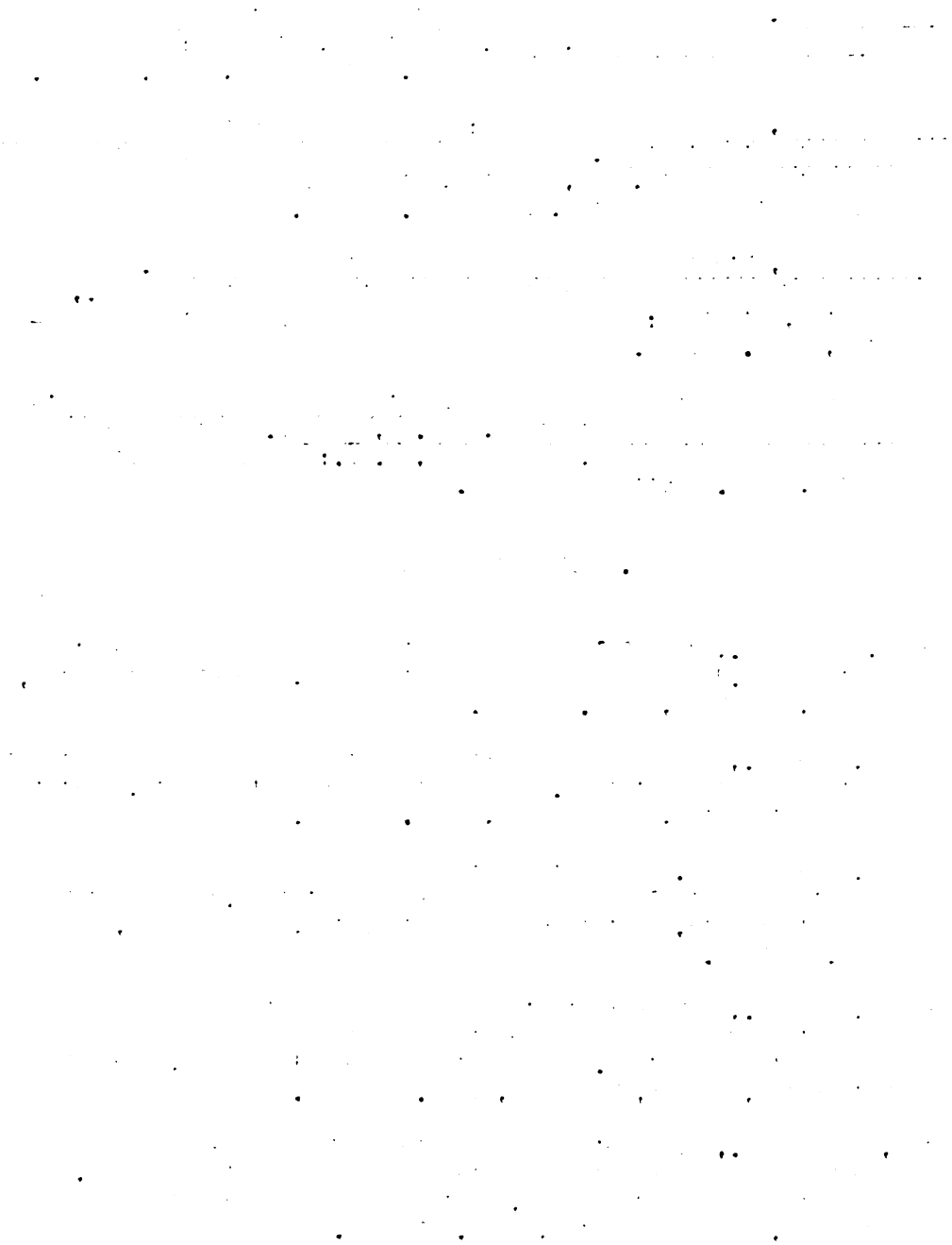

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APPENDIX

A. Copy of questionnaire sent to employed teachers of vocational agriculture who were included in the study.

B. Copy of letter which accompanied the questionnaire.

C. Copy of first reminder letter requesting return of the questionnaire.

D. Copy of second reminder letter requesting return of the questionnaire.

A.

COPY OF QUESTIONNAIRE WHICH WAS SENT TO TEACHERS OF VOCATIONAL AGRICULTURE

Name of Instructor _____ Name of School _____

Post Office _____ County _____

Number of years experience as a teacher of vocational agriculture _____

Do you have 12 or more credits in animal husbandry? _____

INSTRUCTIONS

Check-List on Manipulative Jobs
in
Beef, Sheep, and Swine Enterprises

Under the heading PERFORMANCE, check (x) in one column for each item of each of the enterprises.

Under the heading TO WHOM TAUGHT, check (x) in one or more columns for each item of each of the enterprises.

Check-List on Managerial Jobs
in
Beef, Sheep and Swine Enterprises

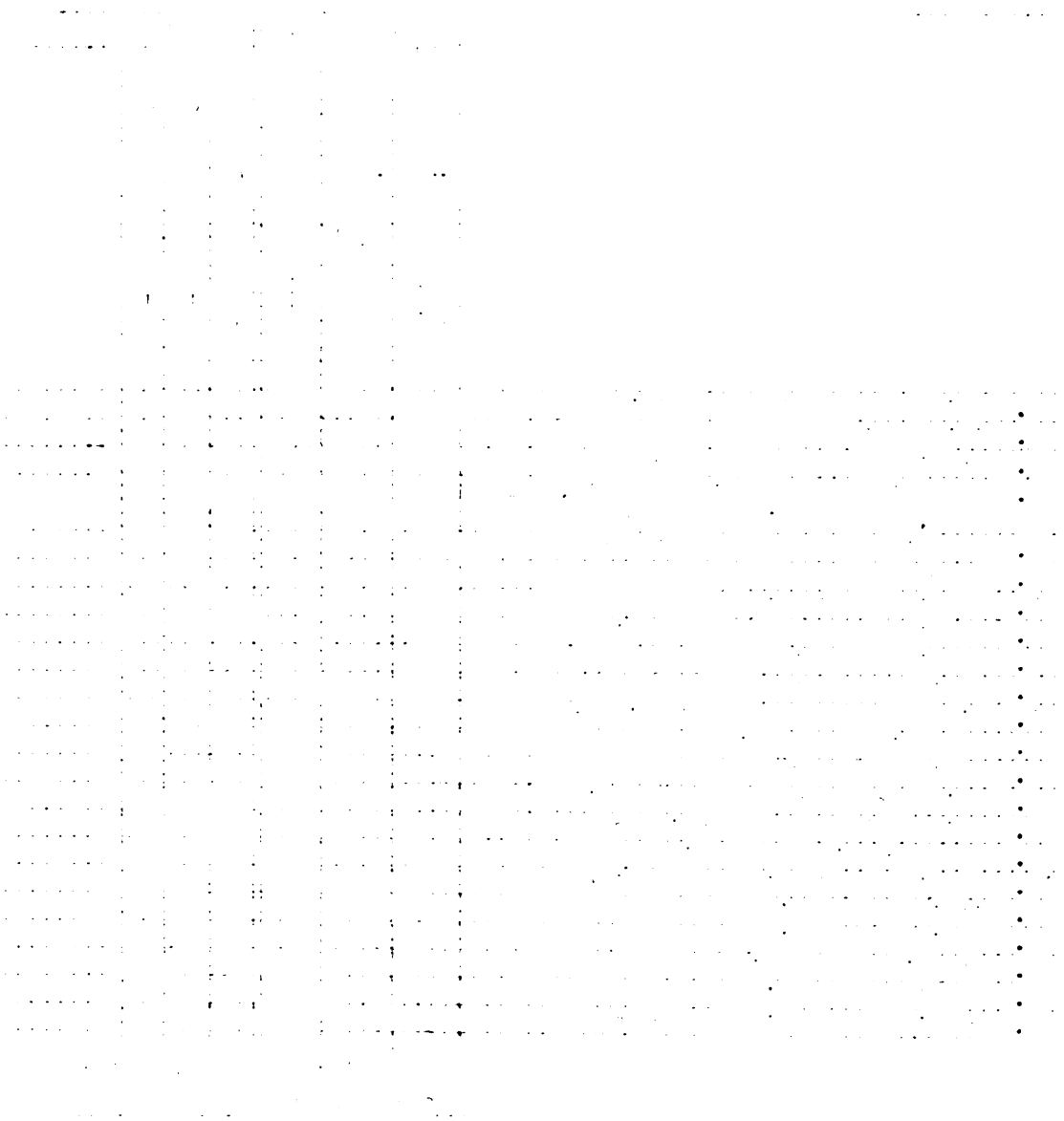
Under the heading TEACHING ABILITY, check (x) in one column for each item of each of the enterprises.

Under the heading TO WHOM TAUGHT, check (x) in one or more columns for each item of each of the enterprises.

In checking the heading TO WHOM TAUGHT, in the manipulative jobs and in the managerial jobs, do not make a separate column for veterans classes and do not consider veterans classes as young-farmer or adult-farmer classes. This study includes only the classes in a regular and complete program of vocational agriculture.

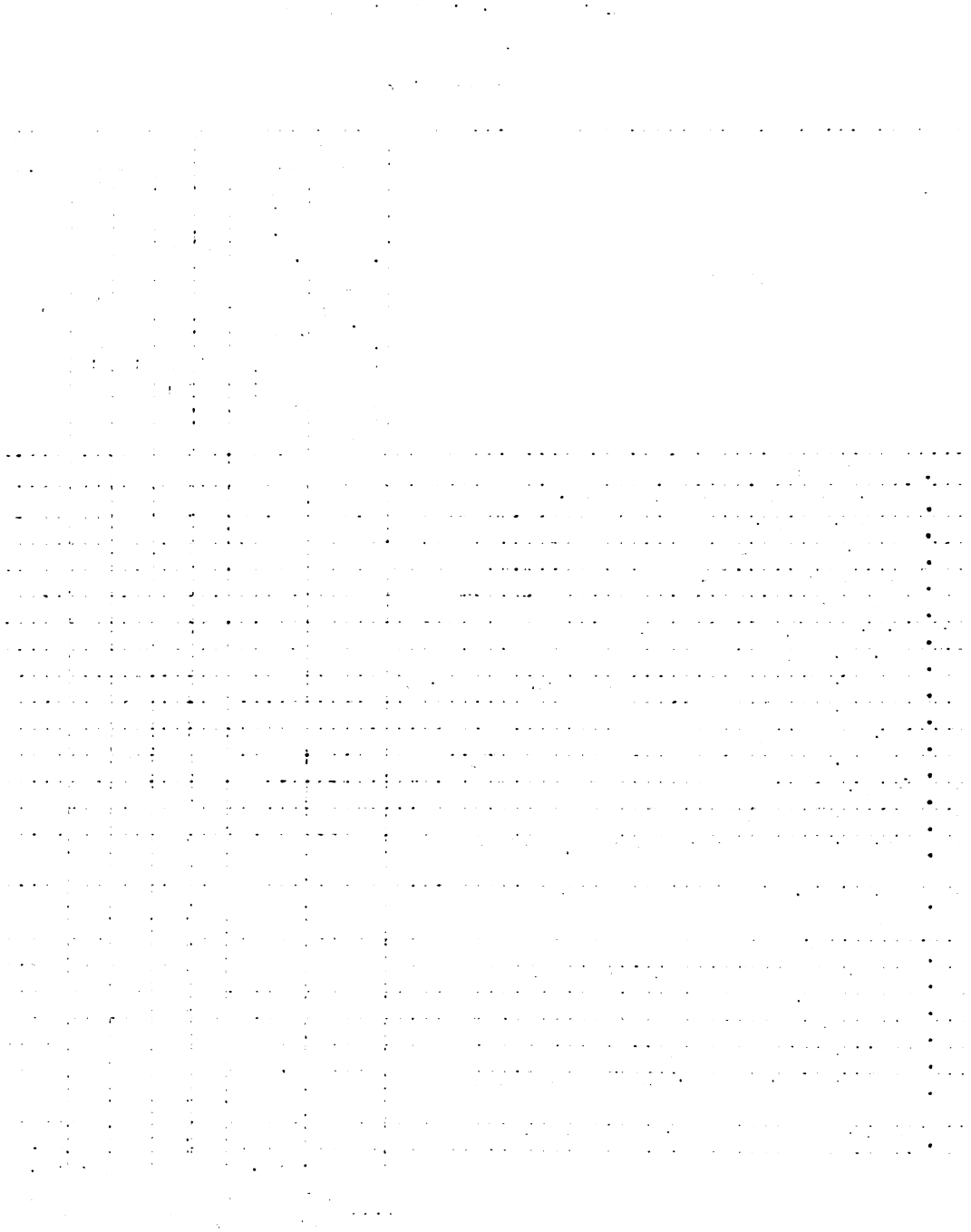
Check-List of Manipulative Jobs
in
Beef Cattle Enterprise

JOBS	Performance			To Whom Taught			
	Have performed; feel qualified to demonstrate	Have performed; do not feel qualified to demonstrate	Have not performed	All-day classes	Young-farmer classes	Adult-farmer classes	Not taught
1. Assisting cows in parturition							
2. Disinfecting the navel of calves							
3. Treating calves for scours							
4. "Dehorning" calves with caustic, horn spoon, or electric dehorner							
5. Dehorning mature beef animals							
6. Castrating bull calves							
7. Treating beef animals for bloat							
8. Removing grubs from beef animals							
9. Treating for ringworm							
10. Placing rings in the noses of bulls							
11. Trimming hooves of beef animals							
12. Butchering beef animals							
13. Cutting up beef carcasses							
14. Taking temperature of beef animals							
15. Taking pulse of beef animals							
16. Treating animals for pink eye							
17. Treating beef animals for lice							
18. Fitting beef animals for show							
19. Showing beef animals							
20. Tattooing or tagging calves							
21. Throwing beef animals by rope method							
22. Treating beef animals for foot rot							
	Check (X) in <u>one</u> column as to performance			Check (X) in <u>one</u> or <u>more</u> columns as to whom taught			



Check-List of Manipulative Jobs in Sheep Enterprise

JOBS	Performance: Have performed; feel qualified to demonstrate	Performance: Have performed; do not feel qualified to demonstrate	Performance: Have not performed	To Whom Taught: All-day classes	To Whom Taught: Young-farmer classes	To Whom Taught: Adult-farmer classes	To Whom Taught: Not taught
1. Tagging ewes							
2. Assisting ewes in parturition							
3. Reviving chilled lambs							
4. Docking lambs							
5. Castrating lambs							
6. Drenching sheep							
7. Giving sheep capsules							
8. Trimming feet of sheep							
9. Spraying sheep to control ticks or lice							
10. Shearing sheep							
11. Tying fleeces of wool							
12. Blocking sheep for shows and sales							
13. Showing sheep							
14. Flushing ewes							
15. Clipping and disinfecting navel cord of lambs							
16. Paint briskets of rams during breeding season							
17. Butchering lambs							
18. Cutting up carcasses of lambs							
19. Ear tagging lambs							
20. Determining the age of sheep							
21. Catching sheep by an approved method							
22. Applying silver nitrate to the eyes of lambs							
23. "Sewing back" eyelids of lambs							
	Check (x) in one column as to performance			Check (X) in one or more columns as to whom taught			

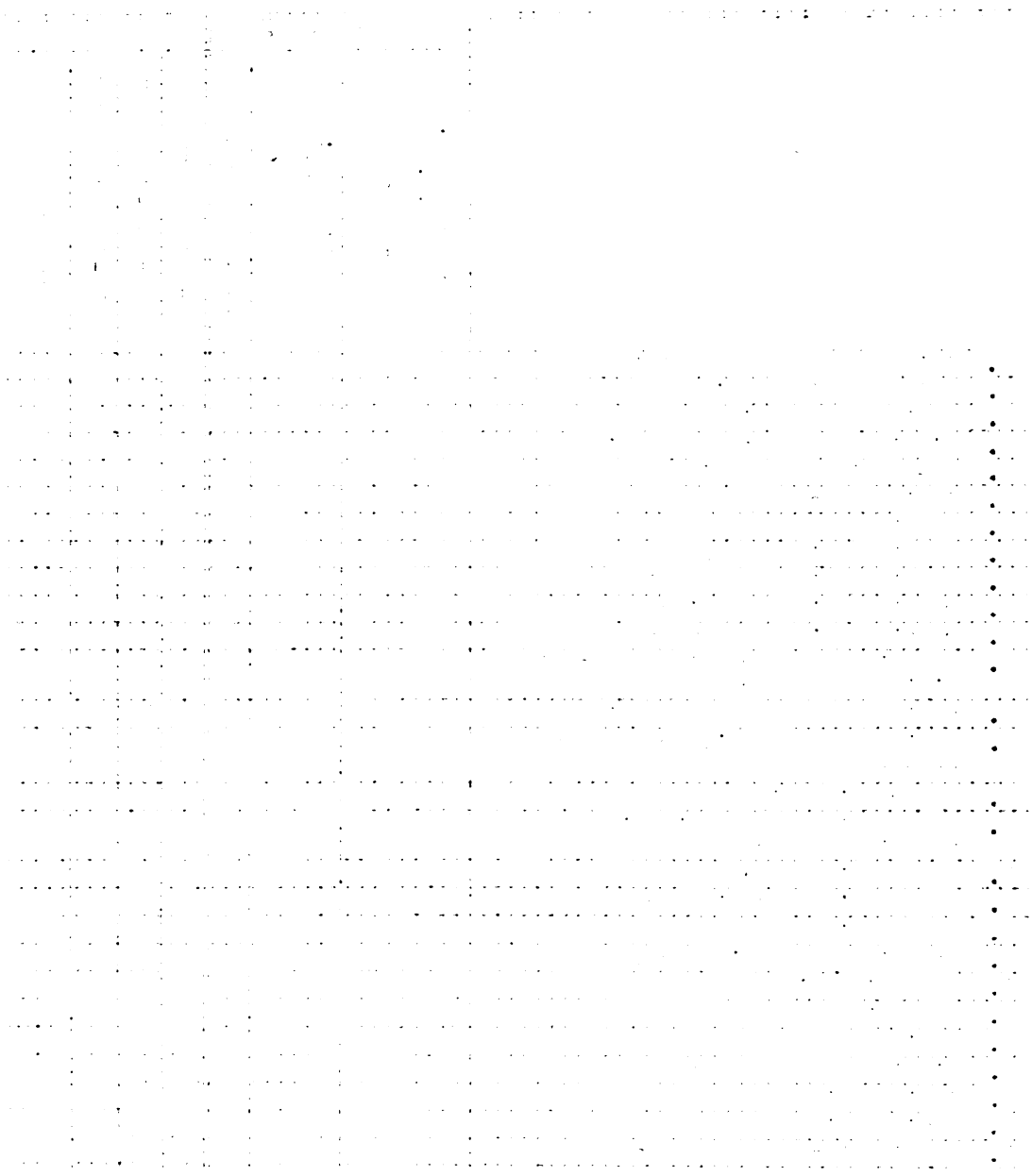


Check-List of Manipulative Jobs

in

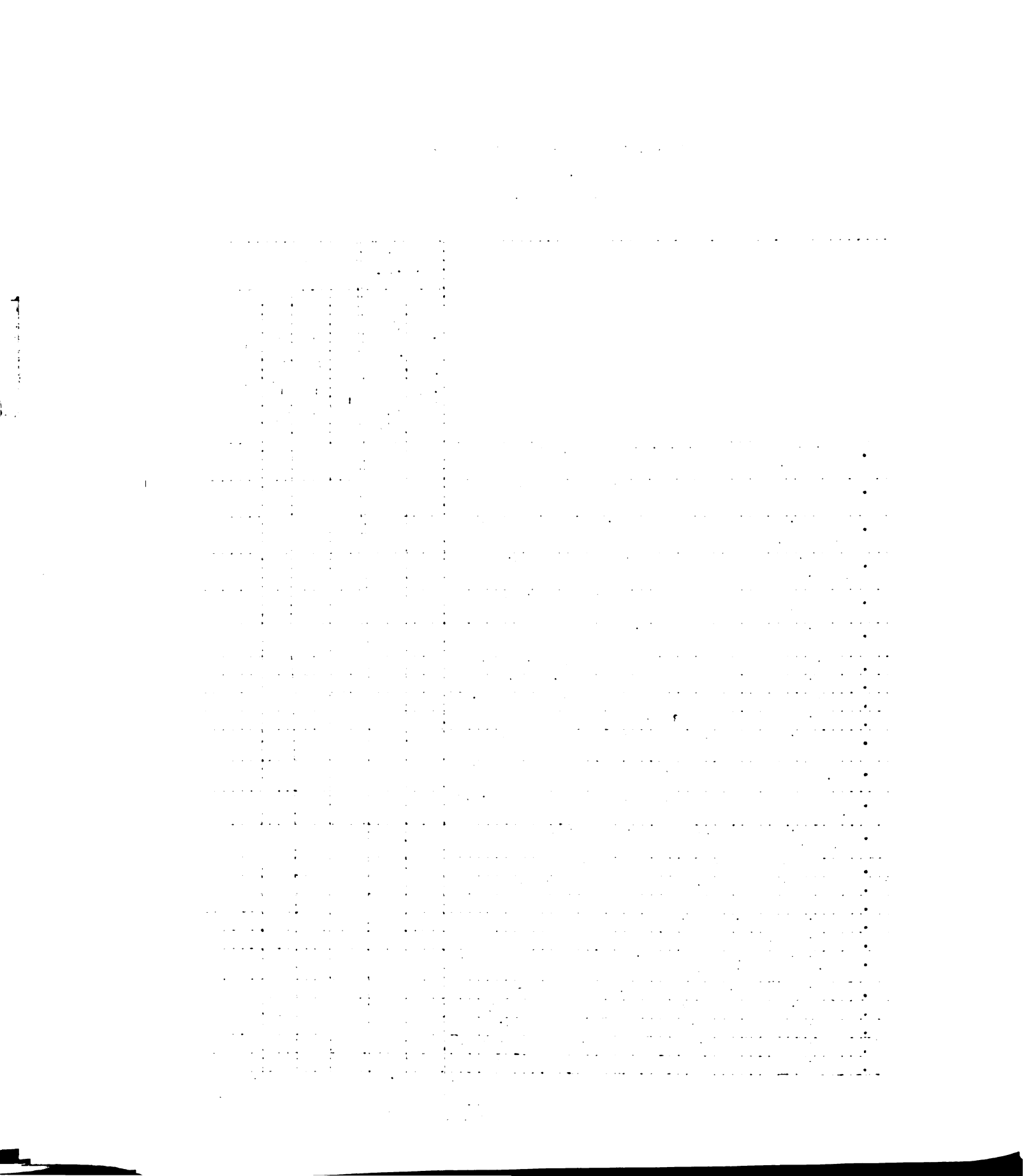
Swine Enterprise

JOBS	Performance			To Whom Taught			
	Have performed; feel qualified to demonstrate	Have performed; do not feel qualified to demonstrate	Have not performed	All-day classes	Young-farmer classes	Adult-farmer classes	Not taught
1. Aiding a sow at parturition							
2. Reviving chilled pigs							
3. Feeding orphan pigs							
4. Clipping needle teeth of pigs							
5. Ear-marking young pigs							
6. Ringing hogs							
7. Treating for scours							
8. Treating swine for worms							
9. Treating swine for anemia							
10. Treating swine for lice							
11. Treating swine for mange							
12. Scrubbing the farrowing house with boiling hot water							
13. Washing sows before farrowing							
14. Hauling sows and litters to clean pasture							
15. Constructing pig brooders							
16. Constructing guard rails in farrowing houses							
17. Constructing hurdles							
18. Constructing breeding crates							
19. Constructing pig creeps							
20. Operating a breeding crate							
21. Castrating pigs by belly method							
22. Butchering hogs							
23. Cutting up hog carcasses							
24. Trimming feet of hogs							
25. Fitting swine for show							
26. Showing swine							
27. Removing tusks from boars							
	Check (X) in one column as to performance			Check (X) in one or more columns as to whom taught			



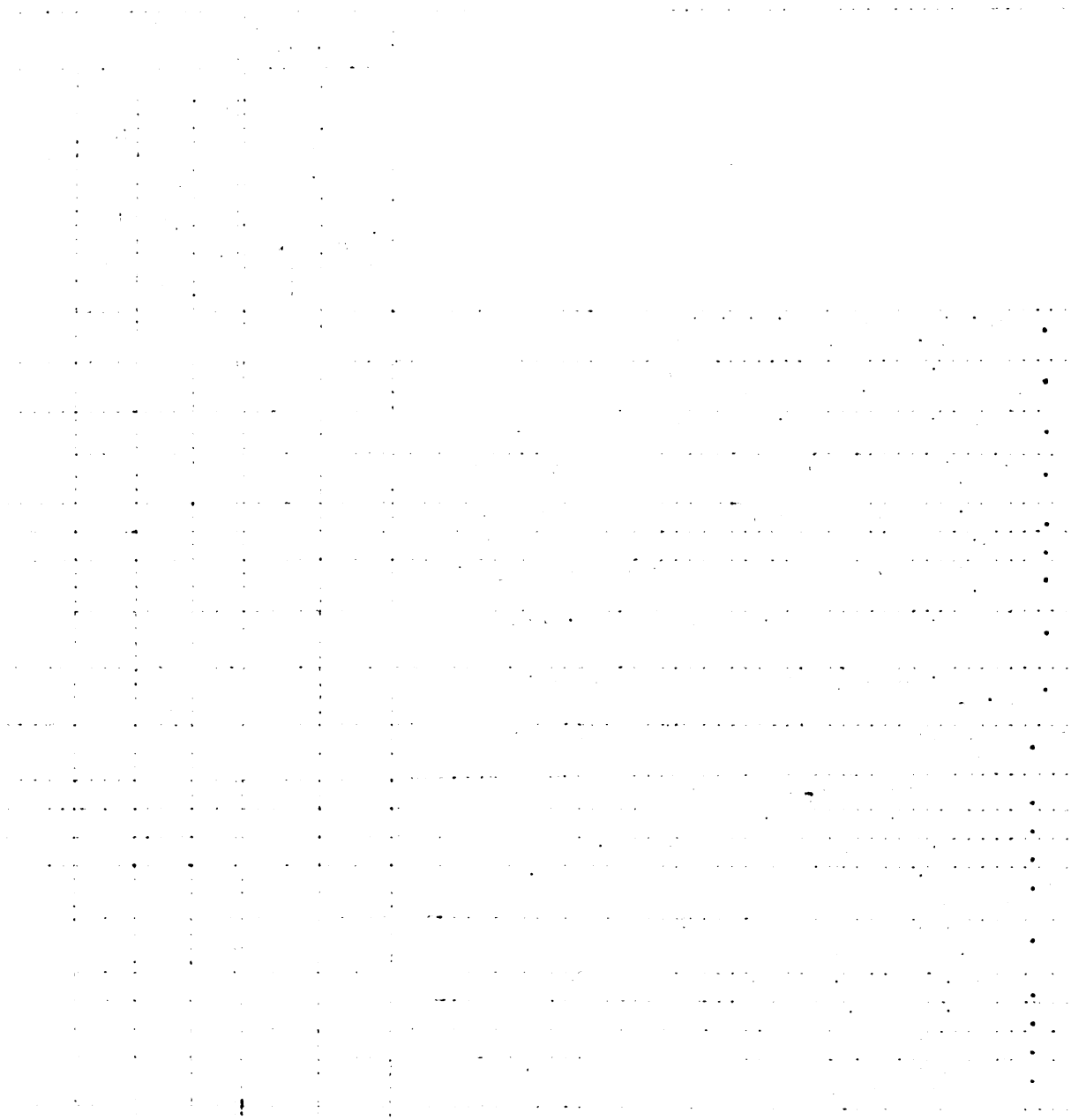
Check-List of Managerial Jobs in Beef Enterprise

JOBS	Teaching Ability		To Whom Taught			
	Qualified to teach	Not qualified to teach	All-day classes	Young-farmer classes	Adult-farmer classes	Not taught
1. Deciding the possibilities of beef production for the home farm						
2. Choosing the breed of beef cattle for the home farm						
3. Selecting suitable foundation stock for the beef herd						
4. Breeding the cows and heifers for spring calving						
5. Caring for the cows and heifers during gestation						
6. Feeding the cows and heifers during gestation						
7. Caring for the cow and calf at calving time						
8. Feeding the cow and calf at calving time						
9. Caring for the cow and calf during lactation						
10. Weaning the beef calves						
11. Marketing feeder calves for the greatest returns						
12. Fattening beef cattle for the most economical gains						
13. Marketing beef cattle for the most econmical returns						
14. Selecting replacement heifers for the breeding herd						
15. Protecting beef cattle from diseases						
16. Protecting beef cattle from parasites						
17. Preparing beef cattle for shows and sales						
18. Culling and improving the beef herd						
19. Keeping records of the beef herd						
20. Providing adequate housing for the beef herd during the winter						
21. Feeding and caring for the herd bulls						
22. Selecting feeder steers for the feed-lot						
23. Feeding the breeding herd during the winter						
24. Feeding the growing stock during the winter						
25. Providing adequate pasture for the beef herd						
	Check (X) in one column as to teaching ability		Check (X) in one or more columns as to whom taught			



Check-List of Managerial Jobs
in
Sheep Enterprise

JOBS	Teaching Ability		To Whom Taught			
	Qualified to teach	Not qualified to teach	All-day classes	Young-farmer classes	Adult-farmer classes	Not taught
1. Deciding the possibilities of sheep production for the home farm						
2. Selecting the type and breed of sheep for the foundation stock						
3. Selecting foundation stock for the breeding flock						
4. Breeding the ewes for the most satisfactory lambing period						
5. Feeding pregnant ewes during the winter						
6. Caring for ewes and lambs at lambing time						
7. Feeding ewes and lambs during the lactation period						
8. Improving the physical characteristic of young lambs						
9. Fattening lambs for the most economical gains						
10. Marketing sheep for the most economical returns						
11. Controlling diseases of sheep						
12. Controlling parasites of sheep						
13. Planning for sheep shearing time						
14. Marketing wool for the most economical returns						
15. Providing adequate housing for the flock during the winter						
16. Culling and improving the breeding flock						
17. Keeping records of the flock						
18. Preparing sheep for shows and sales						
19. Selecting replacement ewe lambs for the breeding flock						
	Check (X) in one column as to teaching ability		Check (X) in one or more columns as to whom taught			

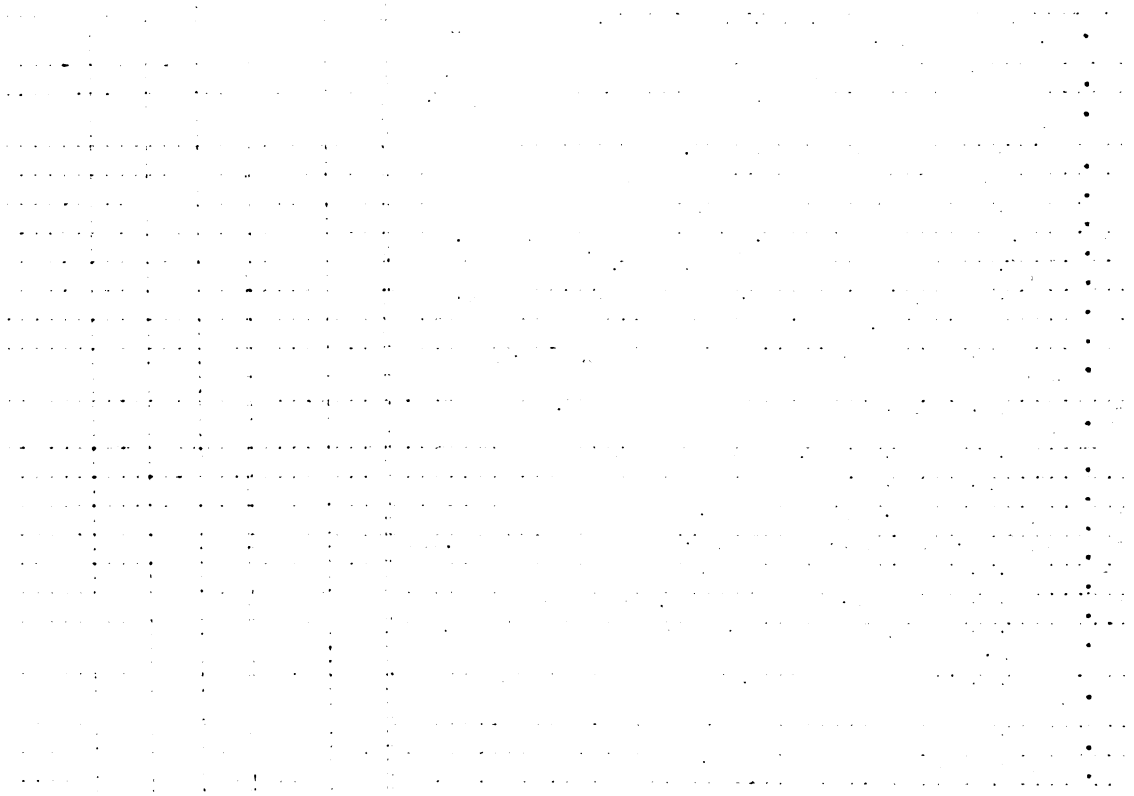


Check-List of Managerial Jobs
in
Swine Enterprise

JOBS	Teaching Ability		To Whom Taught			
	Qualified to teach	Not qualified to teach	All-day classes	Young-farmer classes	Adult-farmer classes	Not taught
1. Deciding the possibilities of swine production for the home farm						
2. Selecting the type and breed for the home farm						
3. Selecting the foundation stock for the breeding herd						
4. Feeding sows at breeding time						
5. Breeding the sows for spring litters						
6. Feeding pregnant sows during the winter						
7. Caring for sows and litters at farrowing time						
8. Feeding the sows at farrowing time						
9. Feeding the sows and litters during lactation						
10. Weaning the pigs at 56 days						
11. Fattening the pigs for the most economical gains						
12. Marketing swine for the most economical returns						
13. Culling and improving the breeding herd						
14. Preparing swine for shows and sales						
15. Preventing diseases of swine on the home farm						
16. Preventing parasites of swine on the home farm						
17. Providing pastures for swine on the home farm						
18. Providing protein supplements for swine						
19. Providing adequate housing for the herd during the winter						
20. Providing adequate equipment for the swine herd						
21. Feeding the herd boars						
22. Keeping records of the swine herd						

Check (X) in one-column as to teaching ability

Check (X) in one or more columns as to whom taught



COPY OF LETTER WHICH ACCOMPANIED THE QUESTIONNAIRE

749 Wisconsin
Lansing, Michigan
April 14, 1950

Mr. _____, Instructor
Vocational Agriculture
High School
_____, Michigan

Dear Mr. _____:

Most of us are interested in improving instruction in the different areas of vocational agriculture. Several teachers are wanting to improve their instruction in the area of animal husbandry. The amount of the improvement, which they can make, is closely related to the manipulative skills and managerial skills which they have in animal husbandry.

A study is being made to determine the skills which the teachers have and to determine which of these skills the teachers need. By using the results of this study the men, who are doing in-service-training, should be better able to assist you in making your teaching of animal husbandry more effective. Also, the department of animal husbandry at Michigan State College should be in a better position to organize its courses for future teachers of vocational agriculture. At the present time there is a committee at the college working on the reorganization of the curriculum for agricultural education. The results of this study should be valuable for this committee in its work.

This research study, which is being done for graduate credit under the guidance of Dr. H. M. Byram, has the endorsement of Mr. Harry E. Nesman, under whom I am employed. He has given me permission to send the survey form to you.

The information, which you submit, will be treated confidentially and only a summary of the data returned by all of the teachers involved will be published.

I appreciate your valuable time in checking the items included in this form. Please do this at your convenience and return in the enclosed, self-addressed, stamped envelope.

Thank you very much for your cooperation in helping with this study.

Sincerely yours,

Conrad White

C

COPY OF FIRST REMINDER LETTER REQUESTING RETURN OF THE QUESTIONNAIRE

749 Wisconsin Street
Lansing, Michigan
May 24, 1950

Dear Instructor of Vocational Agriculture:

All of us in vocational agriculture are very busy at the closing of the school year. However, it would be very much appreciated if you would take a few minutes of your valuable time to check the survey on animal husbandry recently sent to you and then return it in the self-addressed, stamped envelope that was enclosed.

Thank you very much for your cooperation in helping with this research project.

Sincerely yours,

Conrad White

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COPY OF SECOND REMINDER LETTER REQUESTING RETURN OF THE QUESTIONNAIRE

749 Wisconsin
Lansing, Michigan
June 14, 1950

Mr. _____, Instructor
Vocational Agriculture
High School
_____, Michigan

Dear Mr. _____:

Because of the possibility that the first copy of the survey form that was sent to you has been misplaced, you are being sent another copy.

This study is being made to determine the skills which the teachers have and to determine which of these skills they need in animal husbandry. By using the results of this study, all of those concerned should be better able to assist you in making your teaching of animal husbandry more effective.

The information, which you submit, will be treated confidentially and only a summary of the data returned by all of the teachers involved will be published.

It would be greatly appreciated if you would take a few minutes of your valuable time to check the items included in this form. Please do this during the next week and return in the enclosed, self-addressed, stamped envelope.

Thank you very much for your cooperation in helping with this study.

Sincerely yours,

Conrad White

CW:bef